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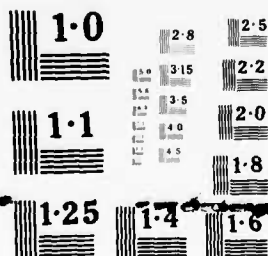
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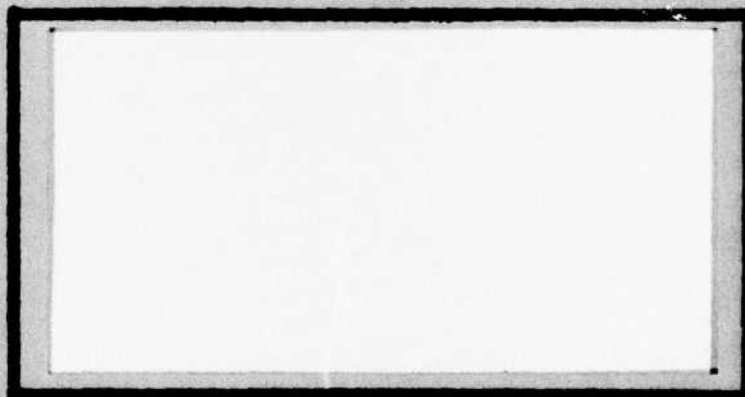
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CONFLICT IN CIVILIAN AND AIR FORCE
PROGRAM/PROJECT ORGANIZATIONS: A
COMPARATIVE STUDY

Karl J. Eschmann, Captain, USAF
Terry S.H. Lee, Captain, USAF

LSSR 3-77B

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The research analyzed the conflict environment in Air Force (SPO) Organizations. The objective was to compare the conflict intensities faced and the modes of resolution used by Air Force program managers with those experienced by civilian program managers over the program life-cycle. These variables were measured in an Air Force sample of program managers using the same instrument that a civilian research team had used in a study of civilian program managers. The Air Force program manager measurements indicated that, as in civilian programs, the perceptions of the conflict intensities changed over the program life-cycle. However, when compared directly with the civilian findings, the data did not demonstrate similarities in what was changing and in which direction. Further, Air Force respondents perceived lesser overall conflict intensities than civilian managers. Differences in these changes were attributed to organizational and environmental factors. A comparison of the modes of resolution used, however, showed that both groups of managers tended to use similar means to deal with conflict. The study's findings can provide Air Force program managers with evidence to help identify where the greatest conflict exists within their own programs, and guide them in selecting means of dealing with the conflict.

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CONFLICT IN CIVILIAN AND AIR FORCE PROGRAM/PROJECT
ORGANIZATIONS: A COMPARATIVE STUDY

A Thesis

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University

In Partial Fulfillment of the Requirements for the
Degree of Master of Science in Logistics Management

By

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September 1977

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This thesis, written by

Captain Karl J. Eschmann

and

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has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT

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CHAPTER I

INTRODUCTION

As a concept for managing and acquiring new major weapons systems for the Air Force, program management is a relatively new and dynamic process. Since its adoption by the Department of Defense, procedures surrounding program management have evolved to their present state, and are even now changing as efforts are made to apply, improve, and update the concept (3:97).

This research deals with the behavioral aspect of conflict in Program/Project Management. For the purpose of this thesis, project management will refer to the management of specified projects under the direction of a designated project manager with the authority to cut across traditional organizational boundaries in order to fulfill his project's objectives. The term program management is used to refer to managing the longer-life, complex military program organizations--the Air Force Weapon System Program Offices (SP0)--or very large and technically complex civilian programs which may contain many ongoing projects. A comprehensive research effort comparing the similarities and differences between project and program management concepts was conducted by Lempke and Mann in their 1976 research (37:9-34). Although the concepts are relatively similar, the structural differences may be significant enough

to warrant a distinction. Also, for the purpose of this thesis, the term SPO manager will be defined as a manager in a weapons system program organization whose role is to tie together, manage, and direct the development and production of a system in order to meet the performance, schedule, and cost objectives assigned to that program (16:3). Throughout this study, the term SPO manager will also refer to the Air Force's counterpart to the civilian program/project manager. Those other managers in a SPO associated with strictly functional type jobs will be excluded from the term, SPO manager. In both Air Force and civilian organizations, the program/project management concepts are found to be operational in that crossing of traditional functional lines is required to accomplish the program/project objectives.

Conflict is a potential problem which faces every manager. As a major characteristic of human behavior in our society, it is inherent in a program/project management environment (47:465). Whenever authority flows in horizontal and diagonal directions, or cuts across other lines of authority on the organizational chart, the potential for conflict increases proportionately (15:78). This relationship is summed up by Kast and Rosenzweig:

The essence of program management is that it is interfunctional and is often in conflict with the normal organizational structure. Thus where the program management approach is used, there is a natural conflict system. Instead of

an organization operating under the traditional view with a well defined hierarchical structure, a unity of command, and clearcut authority and responsibility relationships, the system is much more dynamic and less structured [31:233].

However, the nature of this inherent conflict is not necessarily functional or dysfunctional. As cited by Walton and Dutton in their model of interdepartmental conflict:

To determine whether the conflict has an adverse effect on organizational performance, one must assess the consequences of these characteristics. Whether a competitive orientation is in fact energizing or debilitating for members of the unit will depend in part on the personalities of the participants. For some, competition is motivating and arouses energies not otherwise available for organizational tasks; for others conflict is a major threat. Whether competitive energy will contribute to over-all performance depends upon whether a unit can improve its performance without interfering with the performance of another unit [62:80].

The ability of the program/project manager to foster functional conflict, or to convert dysfunctional conflict to functional conflict, can often determine the degree of success in achieving the project's goals (14:304). It becomes one of his important functions to maintain harmony among many organizational elements with conflicting objectives. To do this, the program manager needs to sustain his effort to employ continual negotiation to keep the program moving smoothly and efficiently. In this manner, he uses purposeful, or deliberate conflict whereby he and the functional managers negotiate the what, when, who, and hows

of the organizational effort (13:78).

Many of the factors relating to conflict can affect the productivity of personnel working in a program management environment. A number of research studies have been conducted concerning the existence of conflict in civilian program/project management organizations (2, 7, 12, 15, 20, 47, 55, 56, 57, 58, 63). However, the literature review has indicated that very few studies have been devoted to studying conflict within a military program management organization.

The military and civilian program/project managers accomplish basically similar jobs but do so in different environments. There are a number of reasons to believe that there may exist a difference in the conflict intensities experienced as a result of environmental differences. Some indications include differences in experience levels for program managers, motives and orientations, leadership styles, layers of management, and outside influences (37:29-33;53:51-57).

Statement of the Problem

Although research studies concerned with conflict have been conducted in civilian program/project organizations, it is not known whether these results are applicable in a military program management environment. There is a need to compare intensities of conflict within military program management organizations with civilian program organizations to determine if the knowledge gained

by the civilian research can be employed by military program managers to effectively deal with dysfunctional conflict.

Justification of Research Effort

As mentioned previously, a review of the literature revealed a wealth of information relating to the existence of conflict in program/project management. However, only two research teams were found that actually attempted to measure the causes and intensities of conflict (20, 55, 56, 57, 58). No attempts to measure conflict in a military program environment were discovered. The results of such measurements are important because to effectively combat the dysfunctional elements of conflict, a manager needs to know first how to identify these elements (8:10). The basic premise that "to fight your enemy, you must know your enemy," should hold true in minimizing the detrimental effect of conflict.

Program Management in the Air Force is a multi-billion dollar effort. It is also a very complex management technique which includes a host of built-in significant problems (1:60). A considerable amount of effort is being made to improve the acquisition process, including the effort on managing human behavior. This emphasis was expressed by General Bernard A. Shriever:

Many times we have found the pacing factor in acquiring new weapon, support, and command and control systems is not technology--it is management. All too often technology has been

known, but it was not properly put to use because of shortcomings in our management ability [60:FWD].

By learning about the causes and intensities of existing conflict, a SPO manager may be better able to cope with problems relating to important program parameters such as cost, schedules, and performance (63:272). The stake involved in controlling these parameters was summed up in a recent article in Aviation Week and Space Technology:

AFSC's [Air Force Systems Command's] current systems acquisition programs have a value of approximately \$7 billion divided between its four product divisions--the Aeronautical Systems Div., Electronic Systems Div., Space and Missile Systems Organization and the Armament Development and Test Center. ASD, the major buyer, has 27 major programs valued at \$3.5 billion [22:75].

Thus, during any phase of a program's life-cycle, mistakes, even small ones, can become unacceptably expensive (11:16). The dysfunctional aspects of conflict could possibly contribute greatly to cost growth or low mission effectiveness. Hence, it is important to know the causes and intensities of conflict issues that may vary over the individual life-cycle stages of a program. The life-cycle stages in Air Force programs include the conceptual, validation, full-scale development, production, and deployment phases (24:23). In each of these phases, the SPO manager's awareness of potential conflict, its nature, and occurrence may be beneficial towards enhancing the decision making process (56:1). This awareness can assist the SPO manager in planning for and adjusting for any detrimental effects of conflict if he understands where and when it may occur.

Related research has indicated some basic assumptions typically assumed to apply to program/project management: (1) that Air Force Program Management and civilian program/project management are generally assumed to be synonymous; and (2) that research conducted in the civilian project organizations typically is assumed to apply to military program organizations. However, if a significant difference does exist, there is a distinct possibility that many of the generally accepted principles associated with program/project management are not compatible or applicable to an Air Force Program Management environment.

Research Objective

The objective of this research is to compare intensities of conflict experienced by SPO managers with those experienced by civilian program/project managers.

The objective will be accomplished in two steps: (1) The intensities of conflict experienced by SPO managers will be measured. (2) The results of the measurement will be compared with the intensities of conflict experienced by civilian program/project managers.

Scope

This study is limited to the comparison of the intensities of conflict and use of conflict resolution techniques by SPO managers of the United States Air Force currently assigned to System Program Offices in the Aeronautical Systems Division (ASD) in the Air Force Systems Command (AFSC).

Organization of the Study

The remainder of the thesis is composed of four chapters with content as follows: Chapter 2 is a review of the literature which describes the current state of knowledge about the problem being explored. Chapter 3 discusses the research methodology, to include a description of the population and sample form from which data was gathered, the data collection techniques, and the analytical approaches which were used in the research effort. Chapter 4 presents an analysis of the data and an interpretation of the results. Chapter 5 presents the conclusions of the study and recommendations for further research in related fields.

CHAPTER 2

A REVIEW OF THE LITERATURE

Numerous studies directly address the historic background and evolution of program/project management concepts (2, 4, 5, 6, 14, 17, 27, 34, 40, 41, 51, 52, 63). Other studies specifically describe the evolution of program management and its associated problems within DOD, particularly the SPO environment in the Air Force (3, 21, 23, 24, 26, 28, 32, 37, 43, 49, 53, 54). An understanding of the structure and inherent problems of program/project management is essential for studying the nature of conflict in a program/project management environment. Many stress and conflict theories are addressed in the research studies and books concerning management, and these readings provide a good background relating to the existence and nature of conflict facing program/project managers (7, 12, 15, 20, 42, 47, 55, 56, 57, 58, 63).

In this chapter, potential sources of conflict in program/project management organizations will be discussed in detail. Immediately following, several important behavioral characteristics deemed necessary to be an effective program/project manager will be described. The final topics to be covered in this chapter are the research findings of two related studies concerning causes and intensities of

conflict in a civilian program/project management environment.

Sources of Conflict in Program/Project Management

Before the conflicts that arise in a program/project organization can be considered, the factors which contribute to the level of conflict must be examined. Authors of research studies concerned with identifying conflict in complex organizations have attempted to categorize the primary sources of conflict (8, 10, 18, 19, 29, 30, 38, 39, 46, 59, 61, 62). Walton and Dutton describe some generally inclusive factors from which conflict can arise (62:73):

- 1) Mutual Task Dependence
- 2) Task Related Asymmetries
- 3) Performance Criteria and Rewards
- 4) Organizational Differentiation
- 5) Role Dissatisfaction
- 6) Ambiguities
- 7) Dependence on Common Resources
- 8) Communications Obstacles

Each factor is described below in detail, and its relation to a program/project management environment is discussed.

Mutual Task Dependence. This variable describes the extent of dependence that two groups have upon each other in accomplishing their respective tasks. In relating this to program/project management, the mutual task dependence of the program/project manager and functional manager will increase or decrease depending upon the degree of friendliness or antagonism that exists between the two managers. A state of high mutual dependence, coupled with two cooperative groups, leads to collaboration in accomplishing the needed tasks. However,

the managerial approaches used to accomplish the tasks may then become a source of conflict (45:252). The degrees of cooperation or conflict cannot be predicted as they relate directly to the situation in which the mutual dependence exists. Regardless whether the outcome is favorable or unfavorable, the potential for conflict will increase with increased mutual dependency (62:73-74). This is pointed out in an example by Derr:

The more two persons or groups are required by the nature of the task to work together (be interdependent), the greater the potential for conflict. If persons must work closely and dependently with one another to get the job done, they will be more sensitive to their disagreements. Forced to collaborate, the magnitude of the consequences of disagreements are intensified to a one-to-one basis because of the nature of the close, enduring relationship. As a result, the potential for friendship or antagonism is in direct ratio to the intensity and frequency of their disagreements. Thus, whenever conflict arises, it is made more intense or less intense by the relative climate of the interdependence between the individuals [18:31].

Task Related Asymmetries. This factor occurs when one group is dependent upon another and the second group has little dependence on the first to accomplish a task. This lack of mutual task dependency can become a cause of organizational conflict. Independent groups who do not have to collaborate on the main body of their work will frequently not communicate or interact with other work groups. These groups will tend to concentrate on their own internal work priorities and generally not understand or seek knowledge of the problems of other persons or groups (18:32). A high degree

of independence can lead to isolation of the work group from the organization as a whole. Isolation can become a danger in decentralized organizations, and frequently occurs when a functional manager fails to recognize his interdependence with other parts of the organization (8:65). As pointed out by Butler, project managers tend to be totally dependent on other groups:

The PM [Project Manager] tends to be totally dependent on functional departments for fulfillment of his assignment. Even if he does have unambiguous authority, he and the members of his team must exercise this authority across organizational boundaries, and these boundary positions are inherently stressful [12:94].

This asymmetry in mutual dependence can mean that one of the functional departments involved in a project may have little incentive to cooperate. The project manager may have to resort to "conflict interference" to gain his objective. This simply means that he persists with interfering in the department's task performance until the needed attention is gained from the independent unit. Human nature always chooses to lay aside the problems with the least resistance so that the ones that cause the most resistance can be dealt with first (62:74).

Performance Criteria and Rewards. Rewards often stem from reviewing a group's performance criteria and determining the success of fulfilling the desired objectives (62:75). Conflict can evolve from rewarding individuals or departments for the successful accomplishment of a task or project, even though many other departments were involved in

a successful project completion, which may provoke ill feelings from the other managers who participated. However, if the project was a failure, then the project manager can rest assured that no hard feelings will result if he does not include his team members as project contributors (62:75).

The program/project management organization introduces other unique problems associated with rewards. This concerns rewarding program/project participants who are temporarily assigned to the team from a functional department. Frequently, the program/project manager may not be in a position to directly reward the support personnel assigned to his team and therefore has difficulty getting these individuals to react to his desires. Unless the assigned team member is placed on the project team on a long term basis, he normally is evaluated by his functional department supervisor. Quite often, the assigned member brings to the project the parochial viewpoint of his own functional department (58:34). Thus, the program/project manager must overcome the problem of motivating the assigned personnel to fit his needs (63:274). Wilemon and Cicero identified this need to do so:

While the project manager . . . has little or no direct influence on promotions and salaries of his interfacing team members, he does have considerable latitude in providing challenging and personally rewarding work assignments for his project team. It should be recognized that the project manager, if not aware of this internal reward structure, is in a position to create increased conflicts

within his project team [63:275].

Organizational Differentiation. Most complex, modern organizations require an integration of the numerous uniform and non-uniform tasks to be accomplished. This can be done by combining the bureaucratic form of organization with a more flexible form of organization such as project management to create a matrix structure (25:268). The contradictory aspects of these two forms will automatically cause sources of conflict. Differentiation relates to the degree of specialization and division of labor within a complex organization (31:214).

Differentiation is defined as the state of segmentation of the organizational system into subsystems, each of which tends to develop particular attributes in relation to the requirements posed by its relevant external environment [33:3-4].

As differentiation increases, the potential for conflict will also increase due to differences in viewpoints. The degree of cooperation between the various departments in an organization determines the need for an overall coordinator such as the program/project manager (62:76). However, if the organization's functional departments are working together in a smooth fashion, then the introduction of a project manager may cause conflict because of over-coordination and/or inexperience with project management techniques (4:78). In most large technical organizations, a functional manager may not be able to devote the time necessary to control a complex project (13:145).

From Butler's observations:

Managers who adopt project management seem to perceive that their functional structures cannot effectively integrate multiple projects; the basic design is departmentation by specialized function, and much effort is devoted to the establishment and clarification of structured relationships among differentiated roles [12:88].

Conflicts evolving from differentiation will occur because people and groups approach problems with totally different orientations. Each subsystem tends to serve and protect their own domain, and other groups with different objectives and orientations become "outside interferences" during periods of interdependence (18:28-30). It is a program/project manager's job to integrate these diverse functional areas and channel their efforts towards the successful completion of a program/project (31:231).

Role Dissatisfaction. Problems in this area can be caused by a variety of reasons. One instance concerns the situation where one group with the same or lower status attempts to set the standards for another group. Resistance to accepting this relationship may result in an unresolvable conflict (47:465-6). This situation could deteriorate even more if a forcing approach is used by the imposing group. In relation to program/project management, Butler points out this danger:

Where the PM is granted complete authority . . . the functional department may become a passive supporting agency rather than a dynamic force which maintains and enhances the specialized capability of the organization. Where the PM is supported unqualifiedly by higher management, the functional organization may assume

the dysfunctional characteristics of the "chronically defeated group" and the overall decision making process will be hampered . . . [12:94].

It is difficult sometimes to determine the balance of authority and responsibility required between program/project and functional managers. The above quote indicates a problem when a program/project manager has too much authority, and yet at the other extreme, he may have so little authority that he is ineffective as an integrative force. Organizations tend to seek a tradeoff in the apportionment of authority in a project-functional relationship which maximizes purposeful conflict while preserving the state of the basic structure (12:94).

A program/project manager has basically two types of authority: formal (legal) authority and informal (influence) authority. His formal authority is conferred on him by the organization and it is related to his real or perceived position on the organization chart levels (13:229). His real power, however, lies in his influence over his peers and associates, and this in turn is based upon his professional reputation. This influence relies on a successful integration of both his delegated and informal authority. A program/project manager can therefore prevent or resolve role conflict through proper understanding and exercise of his authority. The successful program/project manager learns quickly that his power can be gained through recognition of his accomplishments by other members of his environment, and not solely by policy documentation

and legally delegated authority (13:227-9).

Performance goals from functional departments may also suffer as a result of role dissatisfaction derived from slow organizational growth and a shortage in promotion opportunities. In this situation, the role of the functional manager shift from assisting the program/project manager to realizing the desires of his immediate supervisors. The influential effects of horizontal communication become minimized as the functional manager seeks to please those above him who have the power of promotion. The functional manager may be graded solely on performance criteria related to his department; hence, all other activities, such as project efforts may suffer because of higher functional area priorities (62:76). This problem may be carried over to the program/project by assigned functional support team members. The loyalty of this member may remain steadfast to the permanent functional manager in terms of advancement (47:464).

Ambiguities. Overlapping or confused responsibilities and poorly defined objectives results in conflict. Confusion and ambiguity become common conditions when jobs are not clearly defined, authority relationships are obscure, and lines of communication are loose and unorganized (47:464). Ambiguities can occur anytime it becomes difficult to assess the contributions of individual departments (62:77). Conflict can arise as a result of one group attempting to

place blame on other groups during failures, or one group obtaining the credit or rewards for another group's contributions. Obscure authority relationships may lead to severe problems for individuals assigned to matrix organizations. Assigned team members may feel that they really don't know who their boss is and they don't know for sure whom they should try to please and impress in order to receive a good evaluation (47:462). In his investigation into this area, Reeser received numerous comments such as "Functional people assigned to projects are forced to have a divided loyalty to their functional boss and to their project boss. It is so frustrating to some people that they can't stand it; they often request to be transferred . . ." [47:462].

Dependence on Common Resources. This factor is summed up by Walton and Dutton:

Conflict potential exists when two units depend upon a common pool of scarce organizational resources, such as, physical space, equipment, manpower, operating funds, capital funds, central staff resources, and centralized services. If the two units have interdependent tasks, the competition for scarce resources will tend to decrease the interunit problem solving and coordination [62:77].

Sharing common resources will always provoke questions of priority. A functional manager may be rated on the use of his resources, and he may not be willing to share the risk involved in project uncertainties. Although the program/project manager's success may well

depend upon the use of functional support personnel, he may not always have the full authority to commit these resources to his desired schedule. On the opposite end of the spectrum, the program/project manager may have complete authority in selecting the best, most experienced personnel from a functional department. A situation like this may result in losing the functional manager's future cooperation and stirring jealousies of power (51:12-16). Whenever time, schedule, and cost factors relate to common resources between competing groups, conflict is likely to ensue. The manner in which the groups resolve these differences will determine the degree of destructive conflict that may occur (25:266).

Communications Obstacles. As departments become more specialized in their respective areas, they tend to develop their own language and view problems in their own perspective. The "Jargon" used by individual departments can contribute to conflict by causing misinterpretations of situations or problems (62:77). One of the program/project manager's biggest problems is to interface between the scientists and the engineers of different functional groups (63:272). It is to his advantage to have a technical background related to the project work, as a common core of experience reduces communication barriers and decreases the possibility of making unreasonable demands on functional personnel (62:77).

The loose and unorganized lines of communication inherent in project management can cause a lack of pertinent information, or even worse, a great deal of misinformation (7:3). Reeser found this complaint to be commonly voiced by people who had been connected with project organizations. The biggest source of frustration focused on the lack of formalized communication lines to deal with the interface relationships between the program/project and functional organizations (47:464). Lack of pertinent information to complete assigned tasks may cause a work stoppage. To alleviate this problem, a program/project manager must exhibit a great deal of thoroughness and personal sense of organization (7:3). Misinformation can result either through a program/project manager's misinterpretation, or through misperception of information on the part of team members or higher management (misinformation flowing either up or down).

Important Behavior Characteristics of a Program/Project Manager

The real key to the successful application of program/project management lies in the choice of the individual assigned to fill the position (4:79). As Davis pointed out:

. . . project management requires a project manager with considerable role adaptability [17:311].

This is probably the single most important characteristic to consider when choosing a program/project manager. He needs to realize that his first foremost considerations are to be oriented towards broad management techniques rather than technical details (17:313). In most projects, the program/project manager may have to make important decisions on the basis of very little data, which may have been analyzed in haste. Thus, because of the flexibility required of such a manager, many men who have been highly successful in a traditional functional department may not last long in a project environment (4:78).

A program/project manager should be selected to head a program/project as a result of his knowledge and expertise with the field to which the project belongs (4:79). This does not imply that he should be knowledgeable in the technical aspects of each area in the organization. It only means that he should be well informed of the problems that may be associated with the different departments, and be aware of the effects of critical decisions impacting these departments. A program/project manager's influence may well depend on the respect of the personnel he works with. Without the respect and cooperation of the program/project participants, the program/project manager is doomed to fail. Too often this happens when the wrong man is chosen. If he does not provide the example by leadership needed for team participation, then his

only influence may be due to the legal authority vested to him by the organization. In this kind of situation, the role of the program/project manager has reverted to that of functional management (25:147). This is exactly what program/project management is designed to avoid, otherwise there is no need for it. An example of choosing the wrong man as a program/project manager is shown by Avot:

. . . his [project manager's] emphasis must be on the overall view and not technical detail. In fact, his preoccupation with any single aspect of the project may contribute to a failure. For instance, a defense project comprising many complex subsystems was highly influenced by funding for each of these subsystems. The project manager, though a good engineer, felt that his success would be measured by his effectiveness in carrying out the administrative tasks. As a result, he concentrated on funding matters and on shuffling available funds between contracts whose scope was constantly changing because of inadequacies in design and performance. His emphasis on administrative matters was soon reflected by the other members of the project team. The technical aspects and tradeoffs were neglected, and the systems cost was much higher than it should have been [4:79].

Balanced Orientation is another important behavior characteristic of an effective program/project manager. Even though he may be competent in achieving successful short term results, he must also be capable of seeing "the big picture". He must integrate the short and long term objectives in a program/project (27:146). For example, in the design of a new aircraft, the program/project manager must insure that the short run objective is to produce a quality aircraft within the limits of his allotted

budget and schedule requirements. But also of equal importance is the Life-Cycle Cost long run objectives which determine the user's operating and support costs. Many program/project managers have been successful in achieving short run gains, only to find out later that the system became unsupportable in the field in terms of both cost and manhour expenditures (50:19).

Previous Research Efforts to Measure Conflict in a Project Management Environment

As stated previously, only two research teams found in the literature review attempted to actually measure the intensity of potential causes of conflict in a program/project environment. For the remainder of this chapter, a summary of the Evan and Thamhain/Wilemon researches will be presented.

Evan Research Findings

The primary purpose of Evan's research was to investigate some causes and consequences of several types of conflict in two research and development organizations, one in Government and one in industry (20:37). Leading up to Evan's study, it was only stressed by behavioral scientists that some types of conflicts were detrimental and other types were beneficial for the organization. Evan set out to determine what kinds of conflict were beneficial and/or detrimental to the performance of a research and development project. To conduct the research, Evan measured several forms of interpersonal and

technical conflict with respect to the peers, subordinates, and supervisors involved in the project (20:38). Evan theorized that the growing trend towards teamwork, or project efforts by complex technological organizations would bring to the surface a host of new behavior problems not previously considered or emphasized (20:38). The teamwork, or project approach to management provides a built-in opportunity for a greater variety of conflicts to arise, such as those discussed earlier in this chapter.

Evan hypothesized that technical conflict would have a positive effect on project performance, whereas, interpersonal conflicts would have a negative effect. Technical conflict refers to the controversy which arises over the objectives of a project and the means employed to reach them. This type of conflict benefits creativity and generates new perspectives on the problems at issue (20:39). Interpersonal conflict was expected to be detrimental to project performance because of its disruptive nature and the fact that it does not lend itself as readily to rational management (20:39).

The effects of interpersonal and technical conflicts with the three interfacing groups were measured by Evan through a questionnaire survey addressing types of conflict as being dysfunctional and technical conflict as being beneficial to project performance was confirmed

by the analysis of the data obtained. It was also found that interpersonal conflicts which occur between superiors and subordinates were significantly higher than between peers. Conflict concerning technical issues was higher between peers in the team concept, but this conflict produced perceived beneficial results towards meeting the project goals (20:43). A difference was also noted between the civilian and government groups. The civilian group showed a lower degree of project loyalty and a higher degree of professional loyalty than the government group. This was attributed to the lesser degree of job security found in civilian project efforts, whereas there is a greater sense of job permanency attached to government projects (20:43). Although the scope of the Evan research was limited to only two project organizations, it was important in establishing that differences in conflict exist between management of traditional functional organizations and project organizations. It was also important in that it showed that differences existed between civilian and military project organizations, even though the organizational frameworks were similar (20:45).

Thamhain/Wilemon Research Findings

Thamhain and Wilemon picked up where Evan had left off. They carefully selected several specific conflict areas developed in the theory as being fundamental to program/project accomplishment. They then examined the

the conflict intensities of these areas with each of five interfacing groups involved with civilian program/projects (55:2). They went a step further and investigated whether the degree of conflict in each of these conflict areas varied in each of the specific project life-cycle stages. Their purpose in doing this stratification was summed up in their problem statement:

Project managers frequently indicate that one of the requirements for effective performance is the ability to effectively manage various conflicts and disagreements which invariably arise in task accomplishment. While several research studies have reported on the general nature of conflict in project management, few studies have been devoted to the cause and management of conflict in specific project life-cycle stages. If project managers are aware of some of the major causes of disagreements in the various life-cycle phases, there is a greater likelihood that the detrimental aspects of these potential conflict situations can be avoided or minimized [56:31].

Their study continued by examining the various conflict-handling modes used by civilian program/project managers to determine their effectiveness in minimizing conflict situations with project personnel, superiors, and functional support departments. The research was based upon a survey of program/project managers in over 100 technology-oriented companies, which included a variety of aerospace, computer, construction, and research and development organizations. The questionnaire was designed to measure values on three variables: (1) the average intensity of seven potential conflict determinants

over the entire program/project life-cycle; (2) the intensity of each of the seven conflict sources in the four program/project life-cycle stages; and (3) the degree to which conflict resolution modes are used by program/project managers (56:32).

Mean Conflict Intensity Over the Project Life-Cycle. Program/project managers were asked by Thamhain and Wilemon to rank the intensity of conflict they experienced for each of the seven potential sources of conflict (See Table 1). These seven potential sources of conflict were also ranked with respect to each of five interfacing groups, namely, subordinates, assigned project personnel, functional support departments, superiors, and team members (See Table 2).

Table 1

The Seven Sources of Conflict [56:32-33]

Conflict over Project Priorities. The views of project participants often differ over the sequence of activities and tasks which should be undertaken to achieve successful project completion. Conflict over priorities may occur not only between the project team and other support groups but also within the project team.

Conflict over Administrative Procedures. A number of managerial and administrative-oriented conflicts may develop over how the project will be managed; i.e., the definition of the project manager's reporting relationships, definition of responsibilities, interface relationships, project scope, operational requirements, plan of execution, negotiated work agreements with other groups, and procedures for administrative support.

Conflict over Technical Opinions and Performance Tradeoffs. In technology-oriented projects, disagreements may arise over technical issues, performance specifications, technical tradeoffs, and the means to achieve performance.

Conflict over Manpower Resources. Conflicts may arise around the staffing of the project team with personnel from other functional and staff support areas or from the desire to use another department's personnel for project support even though the personnel remain under the authority of their functional or staff superiors.

Conflict over Cost. Frequently, conflict may develop over cost estimates from support areas regarding various project work breakdown packages. For example, the funds allocated by a project manager to a functional support group might be perceived as insufficient for the support requested.

Conflict over Schedules. Disagreements may develop around the timing, sequencing, and scheduling of project related tasks.

Personality Conflict. Disagreements may tend to center on interpersonal differences rather than on "technical" issues. Conflicts often are "ego centered".

Table 2

The Five Interfacing Groups with
the Program/Project (55:2)

Subordinates. Personnel that are directly assigned to the program/project and working under the supervision of the program/project manager.

Assigned Program/Project Personnel. Personnel from the functional departments who are temporarily assigned to the program/project on a "loaned" basis.

Functional Support Departments. In an organization these are the specialized departments from which the program/project manager must obtain support for his program/project, i.e., the engineering office.

Superiors. This refers to the personnel to whom the program/project manager is immediately responsible.

Team Members. This refers to the immediate team members assigned to the project. Sometimes conflict may arise among the team members themselves and the program/project manager may have to step in and resolve the differences.

The rank-order findings of the conflict source intensities over a civilian program's/project's total life-cycle are summarized below:

1. Conflict over Schedules
2. Conflict over Project Priorities
3. Conflict over Manpower Resources
4. Conflict over Technical Opinions
5. Conflict over Administrative Procedures
6. Personality Conflict
7. Conflict over Cost

It was also found almost consistently throughout all seven categories that the intensity of conflict is greatest with functional support departments, followed by assigned

personnel, team members, superiors, and lowest, with subordinates (55:4). For a graphical illustration of these results, See Figure 1.

Intensity of Specific Conflict Sources in Program/Project Life-Cycle Stages. Thamhain and Wilemon asked each program/project manager to rank the intensity of the seven potential sources of conflict in each of the four life-cycle stages. They identified the four generally accepted stages of program/projects for their study as: program/project formation, program/project buildup, main program/project phase and phaseout (2:53) (See Figure 2). A graphical summary of the relative intensity of conflict for each of the potential sources of conflict in the individual life-cycle stages is shown in Figure 3. Furthermore, the trend of conflict intensities over the four program/project life-cycle stages is provided in Figure 4.

Conflict Handling Modes. Thamhain and Wilemon listed five types of conflict resolution modes which they felt were used most often by all managers. These resolution modes, as identified originally by Blake and Mouton* in their research, are as follows:

Withdrawal. Retreating or withdrawing from an actual or potential disagreement.

Smoothing. Deemphasizing or avoiding areas of difference and emphasizing areas of agreement.

Compromising. Bargaining and searching for solutions which bring some degree of satisfaction to the parties in a dispute. Characterized

*See Blake and Mouton [9]

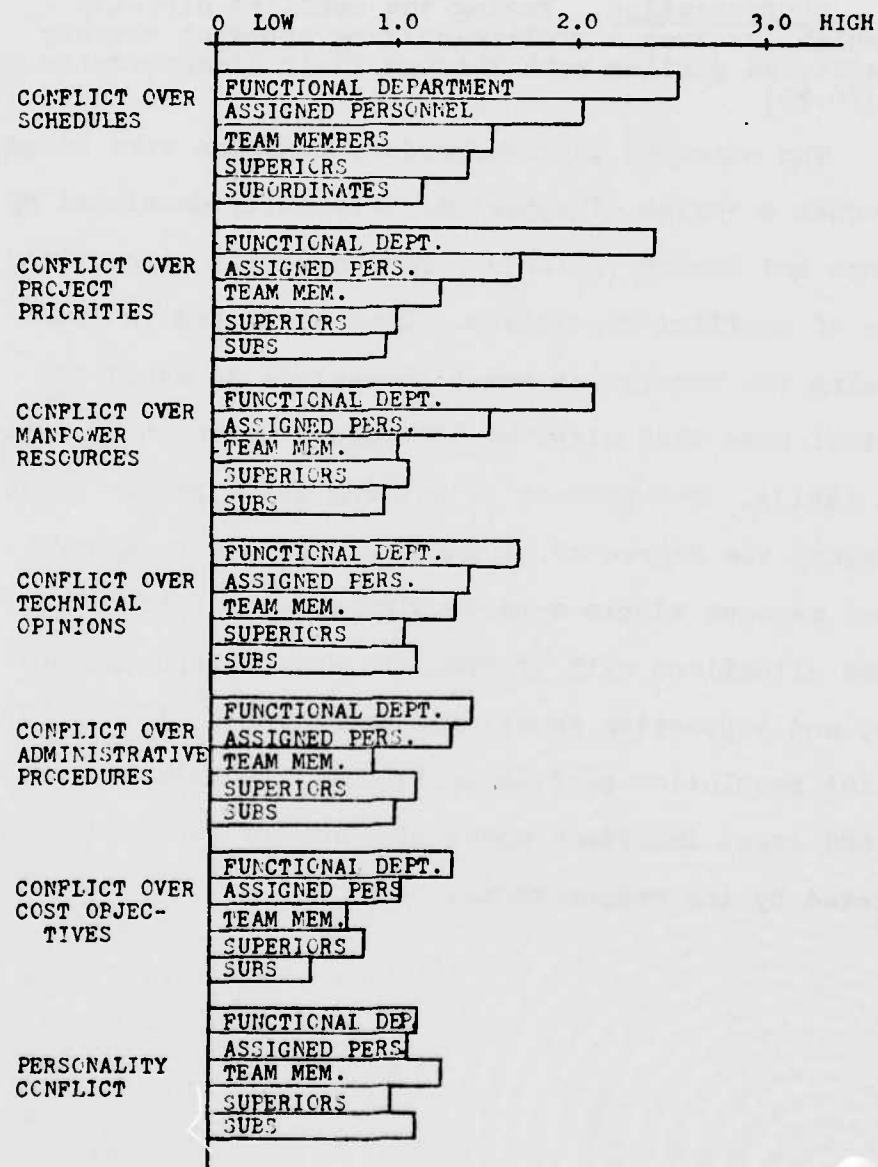
by a "give-and-take" attitude.

Forcing. Exerting one's viewpoint at the potential expense of another. Often characterized by competitiveness and a win/lose situation.

Confrontation. Facing the conflict directly which involves a problem-solving approach whereby affected parties work through their disagreements.
[56:33]

The surveyed program/project managers were asked to rank-order a series of aphorisms originally developed by Lawrence and Lorsch (35:265). Each aphorism represented a mode of conflict resolution. They were used in lieu of naming the resolution modes themselves to avoid the potential bias that might be introduced by the mode descriptions (55:3). The purpose of scoring these proverbs was to measure the degree of strength at which a program/project manager adopts a particular mode in personal interface situations with program/project personnel, superiors, and supporting functional departments (55:3). The conflict resolution profile in Figure 5 illustrates the most and least important modes of conflict resolution as indicated by the measurements.

Figure 1. Relative Intensity of Conflict Perceived by Project Managers [55:11]. (Bars Represent the Average Conflict Intensity Measured for all Managers on a Four-Point Scale)



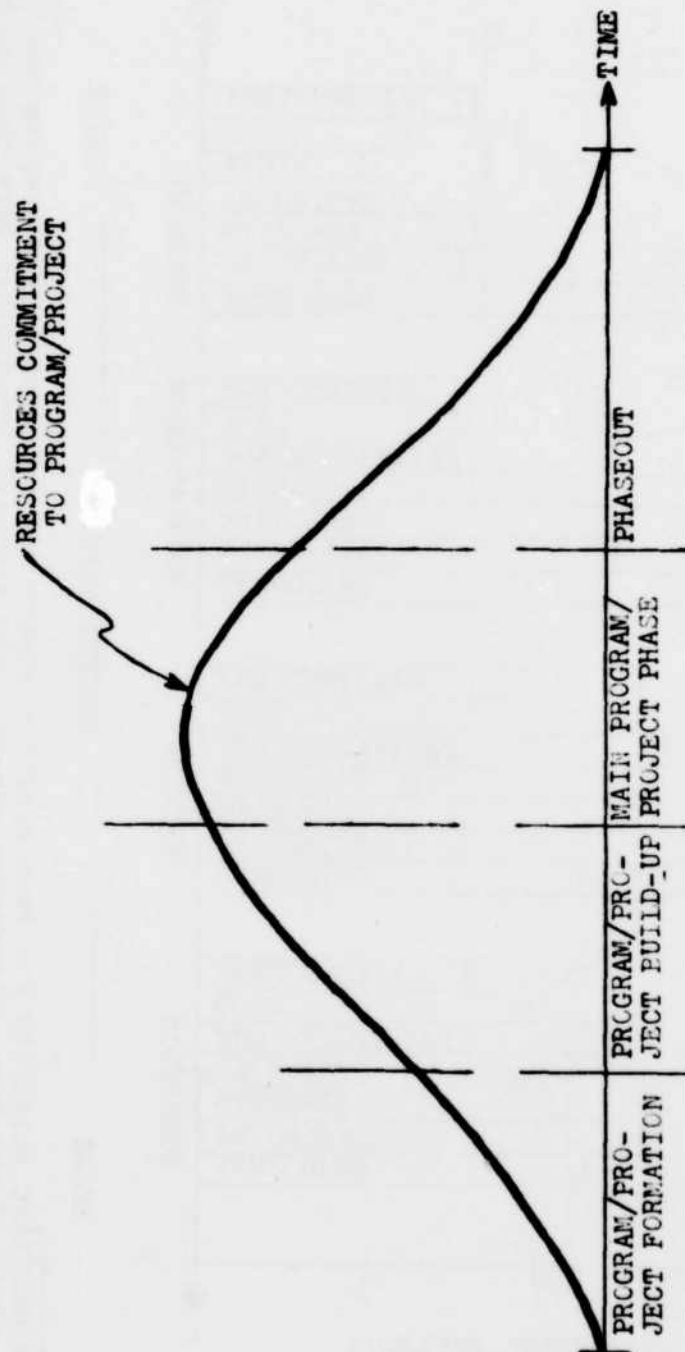
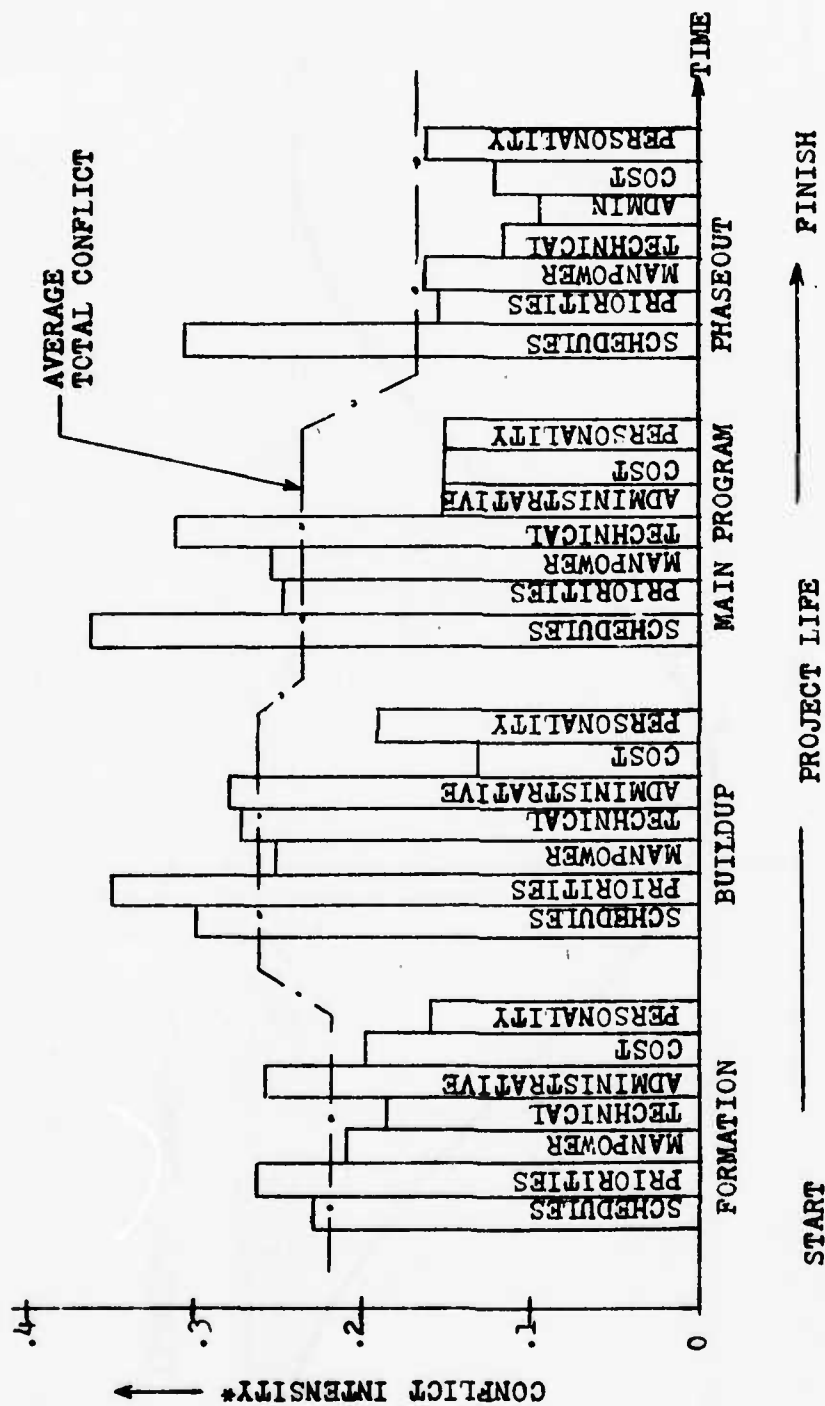


Figure 2. Stages of the Project life-Cycle.



*The Conflict Intensity for each conflict source was calculated by averaging the intensities of the five interfacing groups. The averaged intensities were then multiplied by the total frequency of project managers who indicated the stage where "most" of this conflict occurred.

Figure 3. Relative Intensity of Conflict Over the Life-Cycle of Projects (56:38).

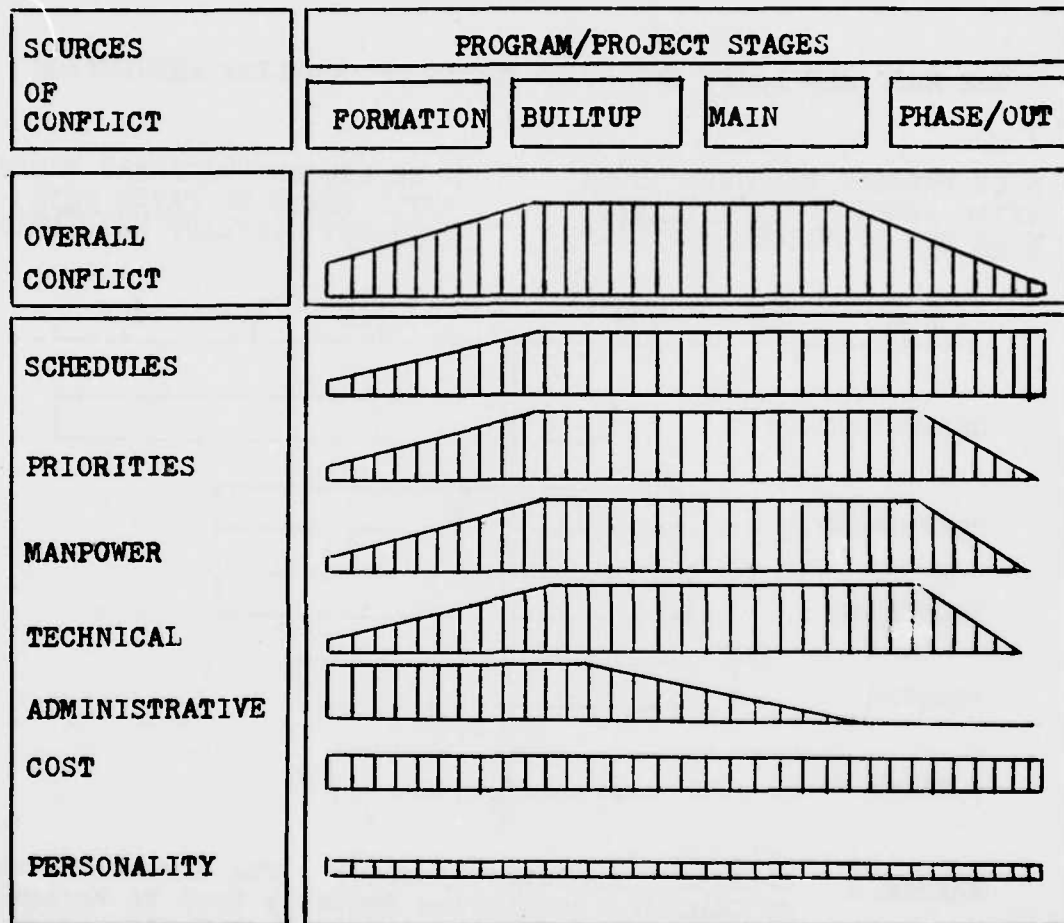


Figure 4. Trend of Conflict Intensity Over the Four Project Life-Cycle Stages [56:43].

CONFLICT RESOLUTION PROFILE

THE MOST AND LEAST IMPORTANT MODES OF CONFLICT RESOLUTION

% OF PROJECT MANAGERS WHOSE
STYLE SEEMS TO REJECT THIS
MODE FOR CONFLICT RESOLUTION

% OF PROJECT MANAGERS WHOSE
STYLE SEEMS TO FAVOR THIS
MODE FOR CONFLICT RESOLUTION

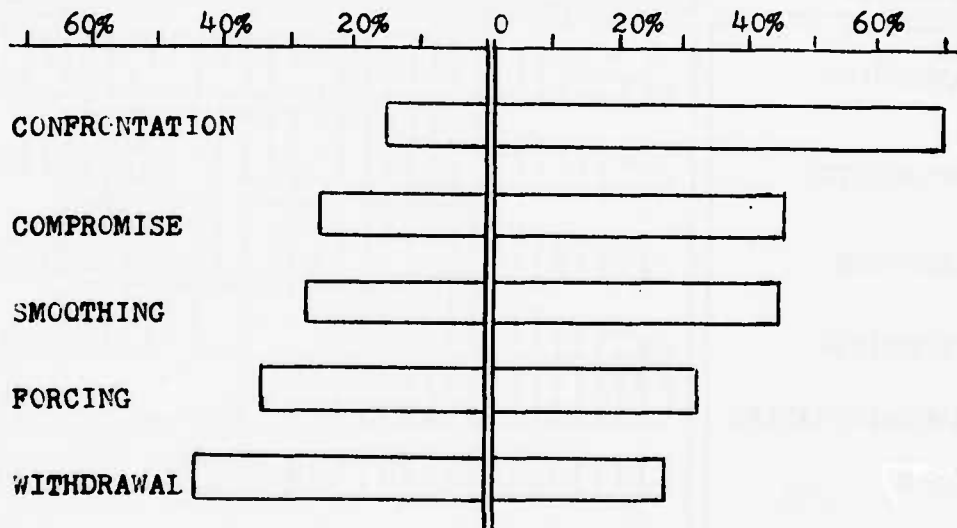


Figure 5. Conflict Resolution Profile (The Various Modes of Conflict Resolution Actually Used to Manage Conflict in Project-Oriented Work Environments [56:45].)

Basis for Further Research

The Evan and Thamhain/Wilemon research studies were directed primarily towards civilian program/project efforts. The question remains as to how their conclusions relate to an Air Force program management environment. That is essentially the basis for this research effort. The Air Force program manager and the civilian program/project manager accomplish basically the same job, but do so in different environments, with different experience, and under dissimilar incentive systems.

Research Hypotheses

Tests of the following research hypotheses provide the information necessary to conduct the comparison:

I. There is no difference in the intensities of conflict experienced by SPO managers and civilian program/project managers for each program/project life-cycle phase.

II. There is no difference in the use of conflict resolution modes by SPO managers and civilian program/project managers.

CHAPTER 3

RESEARCH METHODOLOGY

Introduction

As stated in Chapter 1, the objective of this research was to measure the causes and intensity of conflict experienced by SPO managers during the various phases of the program life-cycle, and to determine the extent to which a SPO manager uses the five modes of conflict resolution. These results were then to be compared with the Thamhain/Wilemon research results. In order to make this determination, the instrument used by Thamhain and Wilemon was used to gather the same type of data on Air Force SPO managers as was gathered in the Thamhain/Wilemon study of civilian program/project managers. Aspects of the methodology and research design are discussed in this chapter.

Universe Description

The universe consisted of all SPO managers, both civil service and military with the Air Force Systems Command, involved in managing Air Force weapons system acquisition programs. As SPO manager was previously defined, administrative and functional support personnel were excluded from consideration/inclusion in the study.

The Population of Interest

The population of interest in this study is limited to SPO managers within the Aeronautical Systems Division.

Program management within AFSC is centered primarily around the three major divisions in the command. These three divisions are (1) the Aeronautical Systems Division (ASD), (2) the Space and Missile Systems Organization (SAMSO), and (3) the Electronics Systems Division (ESD) (1:61). Time and financial constraints dictated that the research population be limited to only one of these divisions. The proximity of ASD to the Air Force Institute of Technology's School of Systems and Logistics, located at Wright-Fatterson Air Force Base, Ohio, made ASD the logical choice to support the study.

Our assumptions concerning the validity of the results in relation to all other Air Force program managers were essentially the same as those considered by Iempke and Mann in their research study:

Because the population was necessarily limited, the data producing sample of program managers is a sample of convenience. However, common policies and regulations in AFSC govern the selection of program managers throughout the command. Additionally, the military members of the population share a variety of common experiences, including professional education, military training, and a multitude of military socializing influences. These results of this study may be applied to the broader population [37:37] .

Sample Selection Plan

The sample of SPO managers for this research was selected from all ASD SPO's which were identified with a particular phase of the weapons system acquisition life-cycle. A stratified random sample of at least fifty SPO

managers was chosen from each of the program life-cycle phase categories. The sample size was selected in order to allow for incomplete questionnaires and non-responses, and yet permit the use of the central limit theorem.

A complete listing of program managers assigned to each SPO in the population was obtained from the individual SPOs. The listings were screened and those individuals not meeting the definition of SPO managers were eliminated. The remaining individuals were assigned a unique number for purposes of sample selection and control. A random number table was then used to select a sample of fifty SPO managers for each program life-cycle phase.

Description of Population Environment

The purpose of a SPO is to develop a particular system or subsystem for military use. Each SPO has a program direction, and the project team is drawn from various functional departments within the Air Force.

The SPO varies in size, depending on the particular system being acquired. At one end of the continuum is the "mini-SPO" such as the various subsystem SPOs. An example of a mini-SPO is the Recce/Strike SPO (3:97). This SPO consists of a number of small programs related to improving reconnaissance and target acquisition systems for both manned aircraft and remotely piloted vehicles. At the other end of the continuum are the so-called

"super-SPOs" such as the F-16, B-1, and F-15 SPOs whose missions involve development/acquisition of entire major new weapon systems. A SPO may range in size from five personnel in a mini-SPO upwards to two hundred personnel in a super-SPO.

Variables Under Consideration

The variables in this study were the phase of the weapons system acquisition life-cycle, potential sources of conflict, interfacing groups, and conflict resolution modes (See Table 3). The level of data for the variables was discrete (limited) and the scale of measurement was nominal. Each of these variables were rank-ordered and the resulting data is on an ordinal scale. The use of an ordinal scale implies a statement of "greater than" or "less than" without our being able to state how much greater or less. Correlations will thus require the use of various rank-order methods known as nonparametric techniques.

The weapons system acquisition life-cycle is divided into five distinct phases: (1) conceptual; (2) validation; (3) full-scale development; (4) production; and (5) deployment. For the purpose of this thesis, the five phases of a weapons system acquisition life-cycle were categorized with respect to the four generally accepted life-cycle stages of a civilian program/project. Using this comparison model, the dependent variables were isolated within

similar categories of the life-cycle to allow a comparison between this study and the results of the Thamhain/Wilemon study. Grouping the five phases into the four stages researched by Thamhain and Wilemon was justified on the basis of the similarity in the nature of tasks and problems involved in each category (See Table 4).

Table 3

Variables Under Consideration

I. THE SEVEN POTENTIAL SOURCES OF CONFLICT (See p. 28)

<u>Variable</u>	<u>Variable Description</u>
S1	Conflict over Program Priorities
S2	Conflict over Administrative Procedures
S3	Conflict over Technical Opinions and Performance Tradeoffs
S4	Conflict over Manpower
S5	Conflict over Cost Objectives
S6	Conflict over Schedules
S7	Personality Conflict

II. THE SIX INTERFACING GROUPS WITHIN THE PROGRAM (See p. 46)

G1	Subordinates
G2	Assigned Program Personnel
G3	Functional Support Departments
G4	Superiors
G5	Spo Team Members
G6	Outside Agencies

III. CONFLICT RESOLUTION MODES (See p. 30)

M1	Withdrawal
M2	Smoothing
M3	Compromising
M4	Forcing
M5	Confrontation

IV. PHASES OF A SYSTEM ACQUISITION LIFE-CYCLE (See p. 44)

P1	Conceptual/Validation
P2	Full-Scale Development
P3	Production
P4	Deployment

Table 4
Categorization of Program Life-Cycle Phases (2:20)

CATEGORIES FOR STUDY	"MILITARY" LIFE-CYCLE PHASES	"CIVILIAN" LIFE-CYCLE STAGES	ACTIVITIES INVOLVED
I	CONCEPTUAL/ VALIDATION	FORMATION	<ol style="list-style-type: none"> 1. Identify need 2. Establish feasibility 3. Prepare proposal 4. Program characteristics validated and refined 5. Program personnel identified and scheduled
II	FULL-SCALE DEVELOPMENT	BUILDUP	<ol style="list-style-type: none"> 1. Design system 2. Build and test prototype models 3. Approval for final production
III	PRODUCTION	MAIN PROGRAM	<ol style="list-style-type: none"> 1. System production 2. Logistical support activities implemented 3. Performance verified during transition to the field
IV	DEPLOYMENT	PHASEDOWN	<ol style="list-style-type: none"> 1. Other agencies assume responsibility for new product 2. Program effort decreases and disbands 3. Personnel reassigned

Data Collection Instrument

The instrument used in this study to gather the sample data was developed by Thamhain and Wilemon for their study of conflict in civilian program/project work environments. In order to retain the validity associated with the study, only minor changes were made to the questions retained from the original instrument. Specifically throughout the questionnaire, the terminology was slightly altered to insure that the military sample would understand the intent of the questions. Several questions that were not applicable to an Air Force program environment were omitted. The only other change was the addition of a sixth interfacing group, outside agencies, in question 11. This was done to determine whether or not outside agencies, which continually interface with SPO managers, cause significant conflict situations. See Table 5 for SPO interfacing groups.

The instrument was then tested for clarity and comprehension by having several officers (within the School of Systems and Logistics) with SPO management experience complete and critique the response sheets. These responses were not used in the final analysis and no significant changes were needed to improve the questionnaire. The official collection of data did not start until after formal survey approval procedures had been completed. A copy of the approved instrument, as well as the approval letter is included in Appendix A.

Table 5

The Six Interfacing Groups
in the SPO Program

Subordinates. Personnel that are directly assigned to the program and working under the supervision of the program manager.

Assigned Program Personnel. Personnel from the functional departments who are temporarily assigned to the program on a "loaned" basis.

Functional Departments. In an organization these are the specialized departments from which the program manager must obtain support for his program, i.e., the engineering office and the procurement office.

Superiors. This refers to the personnel to whom the program manager is immediately responsible.

Other SPO Members. These personnel are the other program team members assigned to a SPO. In a Super-SPO, this may refer to the various subsystem program managers who must work together to deliver a final product. In the smaller SPO's, this may refer to other program managers on the same organizational level upon which a program manager may have to depend on for his own program's objectives.

Outside Agencies. This will include such outside influences such as AFSC Headquarters, the user commands, the Inspector General teams, and the host of outside Air Force agencies that continually interface with ASD program managers.

Data Collection Method

Once the sample was determined, the questionnaire used to collect the data was handcarried to each SPO, where it was personally distributed by the researchers to each selected SPO manager. The purpose of using this distribution method was essentially the same as stated by Lempke and Mann in their study:

1. maximize response (reduce nonrespondent bias) by personally encouraging each subject to respond and by answering questions of an administrative nature concerning the questionnaire, and

2. acquire a "feel" for the SPO environment from which the data would come [37:39].

The respondents completed the questionnaire anonymously and mailed the responses directly back to the researchers. Strict confidentiality was maintained for all respondents at all times. Envelopes with return addresses were provided to expedite the mailing process.

Ranking of Sample Responses

The variable values needed to support or disprove the hypotheses were obtained primarily from questions 11 and 14 in the survey questionnaires (See Appendix A). All other questions were used to either support or refute reasons why certain conflict variables were ranked either high or low.

Question 11 provided the data needed to make statistical inferences regarding intensities of the potential sources of conflict for each of the six interfacing groups.

The intensity of conflict experienced by program managers was measured on a grid specifically designed for the Thamhain/Wilemon study. Program managers were asked to indicate on a standard four-point scale the intensity of conflict they experienced for each of the seven causes of conflict with each of the six interface groups.

Once the information was collected, mean intensity scores for each interfacing group were computed for each of the seven sources of conflict. These averages were taken in order to rank the overall importance of the sources of conflict identified by the respondents. This method was the same as used in the study by Thamhain and Wilemon (55). However, the reader is cautioned that these averages are not averages in the true sense of the word, but instead are employed only to give a relative position to each of the sources of conflict and type of interfacing group. The source of conflict with the highest mean intensity value was then assigned a rank value of one, the second highest a two, and so on. Ties on rank responses were reconciled according to a procedure under which each tied response was assigned the average rank value for the ranks concerned (48:217-8).

Question 14 dealt with conflict resolution modes measured against the interfacing group variables. This set of measurements relied on the research of Lawrence and Lorsch (35:265), who developed various sets of aphorisms

to describe methods of resolving conflict (See Table 6). Fifteen of these aphorisms were selected to match the five methods of conflict resolution described previously in Chapter 2. These proverbs were used to avoid the potential bias that might be introduced otherwise by the use of social science jargon (56:34). Their relative mean scores were ranked by the same method described for the data derived in question 11.

The existence of ordinal level data called for the use of nonparametric statistics to test for relationships (or differences) between variables and for the comparison of findings between civilian and Air Force program management organizations.

For the purpose of analyzing the data from Air Force SPO managers, the following tests were considered:

Test I. The intensity of each source of conflict experienced by SPO managers does not differ across the different program life-cycle categories.

Test II. The intensity of each source of conflict experienced by SPO managers does not differ among specific interfacing groups.

Test III. The conflict resolution modes used by SPO managers do not differ among specific interfacing groups.

These tests are used to established relationships within the data collected from the Air Force sample, in preparation for comparing the Air Force results with those of Thamhain and Wilemon on civilian program/project managers.

Table 6
Aphorisms Describing Five Modes of
Conflict Resolution

RESOLUTION MODE	APHORISM
Forcing	<ol style="list-style-type: none"> 1. Might overcomes right 2. The arguments of the strongest always have the most weight 3. If you cannot make a man think as you do make him do as you think
Smoothing	<ol style="list-style-type: none"> 1. Kill your enemies with kindness 2. Soft words win hard hearts 3. When one hits you with a stone, hit him with a piece of cotton
Confrontation	<ol style="list-style-type: none"> 1. Come now and let us reason together 2. By digging and digging the truth is discovered 3. A man who will not flee will make his foe flee
Withdrawal	<ol style="list-style-type: none"> 1. He who runs away lives to run another day 2. Don't stir up a hornet nest 3. When two quarrel he who keeps silence first is the most praiseworthy
Compromise	<ol style="list-style-type: none"> 1. Better half a loaf than no bread 2. You scratch my back, I'll scratch yours 3. It is easier to refrain than to retreat from a quarrel

The Statistical Test for Correlation

The statistical test used in this research was the Kendall rank correlation coefficient, Tau. A review of Siegel's Nonparametric Statistics for the Behavioral Sciences (48) and the Statistical Package of the Social Sciences (SPSS) (44) revealed that the Kendall rank correlation is a most appropriate test for the correlations made in this study.

The Kendall rank correlation coefficient measures the degree of association between two arrays of ordinal measurements of a common group of items. The value for Tau is obtained by arranging one array in rank order and then examining the corresponding rank values for the second array (48:214). The procedure considers all possible pairs of rank values in the second array, adding to the value of Tau for values which are in natural order, subtracting for pairs out of order, and adjusting for ties in either array. If the arrays are in perfect agreement with no ties, the value of Tau is +1.00, indicating the maximum possible agreement. If the arrays are in reverse natural order with no ties, the value of Tau is -1.00. According to Siegel, Tau is a function of the minimum number of interchanges of ranks necessary to transform the second array into the same order as the first array and may be considered as a coefficient of disarray between two rankings (48:215).

The computation for Tau was based on the following formula (44:290):

$$\text{Tau} = \frac{S}{\sqrt{\frac{1}{2}N(N-1)-T_x} \sqrt{\frac{1}{2}N(N-1)-T_y}}$$

Where:

S=the sum of the product of indexes for each possible pair in each ranking. A pair in order has an index of +1. A pair tied has an index of 0. Thus a pair tied on either rank contributes nothing to S, whatever the sign of the other rank (48:216).

N=the total number of objects ranked.

$T_x = \frac{1}{2} \sum t(t-1)$, t being the number of ties on a specific rank in the first array, or X variable.

$T_y = \frac{1}{2} \sum t(t-1)$, t being the number of ties on a specific rank in the second array, or Y variable.

The significance of Tau is that if the two arrays of ranks are unrelated, any possible order of the second array is equally likely, each with an associated value for Tau. For values of N less than 8, specific tables have been calculated which determines the probability of Tau through the statistic S, of which Tau is a function (48:220).

The specific test of the null hypothesis is performed by comparing a value of the test statistic S for the rank order comparison to a critical value of S obtained from tables. The critical S value identifies the allowable probability of erroneously rejecting the null hypothesis when the null hypothesis is true.

In this formula, Tau and N are defined as they have been used previously. The denominator in this formula is

the standard deviation of Tau. SPSS was used to perform the calculations.

Rejection/Acceptance of Hypotheses

Each of the hypotheses were tested at the $\alpha = .05$ level of significance. Since a significant positive relationship was considered to infer agreement (or no difference), the test was "one tailed", assigning the acceptable probability of error to the right tail of the normal distribution. Rejection of the null hypotheses led to the support of the alternate hypothesis. Rejection of a null hypothesis is a stronger statement than is the failure to reject. Failure to reject cannot be strictly equated with acceptance. This leads to a tendency to state "the other side" of the researcher's thoughts often constrained by the nature of the conclusions which can be drawn from existing statistical tests (48:14).

The specific hypotheses considered for each comparison in this study were derived from the tests for analysis of sample data and from the research hypotheses of this study. In each of the following stated hypotheses, the variables are defined as they are listed in Table 3, page 43. The hypotheses are explained by the following statistical testings:

1. Test I. The intensity of each source of conflict experienced by SPO managers does not differ significantly across the different program life-cycle categories.

Null Test Hypothesis: The ranking of S1, S2, S3, S4, S5, S6, and S7 for P_i differs from the corresponding ranking for P_j (i and j=1, 2, 3, 4 and i≠j).

Alternate Test Hypothesis: The rankings do not differ.

To evaluate Test I, six null hypothesis which considered all possible combinations between P_i and P_j were tested. If the null hypotheses were all rejected, Test I was supported. If Test I is supported by any of the tests this would indicate that there is a difference between SPO managers and civilian program/project managers. This would be true because the results of the Thamhain/Wilemon research indicated that the rankings differed in each of the life-cycle stages (See Figure 3, page 34). This would also indicate that Research Hypothesis I is not supported for each of the phases. These tests also indicate where there are similarities among the different program phases when the null is rejected, or dissimilarities when accepted.

2. Test II. The intensity of each source of conflict experienced by SPO managers does not differ among specific interfacing groups.

Null Test Hypothesis: The ranking of S1, S2, S3, S4, S5, S6, and S7 for G_i differs from the corresponding ranking for G_j (i and j=1, 2, 3, 4, 5, 6 and i≠j).

Alternate Test Hypothesis: The rankings do not differ.

To evaluate Test II, fifteen null hypotheses which considered all possible combinations between G_i and G_j were

tested. If the null hypotheses are rejected, Test II was supported. Support indicates where possibilities of similarities exist between interfacing groups with respect to sources of conflict in the military environment and non-support indicates dissimilarities.

3. Test III. The conflict resolution modes used by SPO managers do not differ among specific interfacing groups.

Null Test Hypothesis: The ranking of M1, M2, M3, M4 and M5 for G_i differs from the corresponding ranking for G_j (i and $j=2, 3, 4$, and $i \neq j$). G_2 included subordinates, assigned personnel, and other SPO members.

Alternate Test Hypothesis: The rankings do not differ.

To evaluate Test III, three null hypotheses which considered all possible combinations between G_i and G_j were tested. If the null hypotheses were rejected, Test III was supported. Like Test II, support indicated possibilities and similarities and non-support dissimilarities.

4. Research Hypothesis I. There is no difference in the intensities of conflict experienced by SPO managers and civilian program/project managers for each program/project life-cycle category.

Null Hypothesis: The ranking of S1, S2, S3, S4, S5, S6, and S7 for SPO managers differs from the corresponding ranking for civilian program/project managers for each P_i ($i=1, 2, 3, 4$).

Alternate Hypothesis: The rankings do not differ.

To evaluate Research Hypothesis I, four null hypotheses were tested. If the null hypotheses were rejected, then Research Hypothesis I was supported. If all four null hypotheses were rejected, this would indicate that the SPO managers and civilian program/project managers are very similar and that each came from the same population. If there is a combination of support and non-support, or total non-support of the Research Hypothesis I, both of these managers are probably not from the same population. Similarities would be reflected by support and non-support areas of the Research Hypothesis I, respectively.

5. Research Hypothesis II. There is no difference in the use of conflict resolution modes by SPO managers and civilian program/project managers.

Null Hypothesis: The ranking of M1, M2, M3, M4 and M5 for SPO managers differs from the ranking for civilian program/project managers.

Alternate Hypothesis: The rankings do not differ.

Rejection of the null hypothesis would support Research Hypothesis II that SPO managers and civilian program/project managers use conflict resolution modes in a similar manner.

Assumptions of the Study

1. The data to be collected is based on perceptions. It is assumed that the data to be gathered and the information obtained from it is representative of the true relationships that exist.

2. It is assumed that the sample of SPO managers is representative of the population of SPO managers assigned to system program offices within the Aeronautical Systems Division.

3. It is assumed that each respondent answered each question independently, and the responses are reflective of his true feelings.

4. It is assumed that the difference in various SPO organizational levels has no bearing on the data to be gathered.

5. In order to permit statistical testing and comparisons, the Thamhain/Wilemon study was assumed to have been accomplished in a professional manner, and the results reported accurately reflect the data they obtained.

6. Definitions and assumptions from supportive research studies were valid and reasonable. For example, the stratification of the program life-cycles were logically and sufficiently defined to allow comparisons between civilian and Air Force programs/projects.

Limitations of the Study

1. The study is limited to the various system program offices in ASD at Wright-Patterson Air Force Base, Ohio.

2. The results of this study may be formally generalized only to system program offices within the Air Force Systems Command.

3. Validity of the results comparing the data collected in this study to that collected by Thamhain and

Wilemon is limited by the validity of results reported by
Thamhain and Wilemon in their articles.

CHAPTER 4

DATA ANALYSIS AND INTERPRETATION

The data analysis was accomplished in four parts. First, the collected data was examined to determine that the survey forms were understood and properly completed. During this effort the response rate was analyzed. Second, the data itself was analyzed to determine the implications it contained about the Air Force SPO managers. Third, the findings were compared with findings published in the civilian literature to determine if the military findings parallel those from the civilian environment. Finally, additional analysis was conducted to further explain the conclusions of the study.

PART I. RESPONSE RATE

Of the 200 questionnaires sent to twenty-three SPOs located throughout ASD, 151 were returned representing a 75% response rate overall. Of these, 15 were incomplete or filled out incorrectly and were thus unuseable for purposes of analysis. The remaining 136 questionnaires represented a 68% useable response rate. These responses were quite evenly distributed across the categories and sufficiently numerous to support an analysis of the null/alternate hypotheses. The distribution of responses by categories is depicted in Table 7.

Table 7
Response Rate by Program Life-Cycle Category

CATEGORY*	SENT	RECEIVED	USEABLE	% RESPONSE	% USEABLE
I	50	36	30	72%	60%
II	50	44	42	88%	84%
III	50	36	32	72%	64%
IV	50	35	32	32%	64%
TOTAL	200	151	136	75.5%	68%

*The categories refer to the life-cycle phases/stages described on page 44.

PART II. INTERNAL DATA ANALYSIS

The internal data analysis includes the three tests of the data collected to understand the military environment. These tests were used to establish relationships within the data collected from SPO managers, in preparation for comparing the Air Force results with those of Thamhain and Wilemon in the Research Hypothesis.

Test I. The intensity of each source of conflict experienced by SPO managers does not differ significantly across the different life-cycle categories.

The objective of this test was to determine whether the emphasis on the sources of conflict was similar or dissimilar within each life-cycle category. It provided a means of determining whether any changes were taking place with respect to conflict intensities for each conflict source as the program life-cycle was progressing. The findings of this test allowed further testing in the Research Hypothesis I comparison with the civilian findings.

The relative intensities of the seven sources of conflict were rank ordered one through seven by category, with the highest relative intensity having the rank of one. These rankings are presented in Table 8. Test 1 was analyzed using the null/alternate hypotheses tests of Kendall Tau between the rankings by categories.

Null Hypothesis, H_0 : The rankings disagree.

Alternate Hypothesis, H_1 : The rankings agree.

Table 8
Ranked Sources of Conflict by Category¹

CATEGORY ²	PROGRAM PRIORITIES	SOURCES OF CONFLICT					PERSONALITY
		ADMINIS- TRATIVE	TECHNICAL ISSUES	MANPOWER RESOURCES	COST OBJECTIVES	SCHEDULES	
I	2	5	3	1	6	4	7
II	1	5	2	2	6	4	7
III	1	2	3	4	6	5	7
IV	1	2	4	5	6	3	7

¹ The relative intensities of seven sources of conflict were rank ordered one through seven by category with the highest relative intensity having the rank of one.

² Category refers to life-cycle phases/stages described on page 44.

The results of the null/alternate hypothesis tests are presented in Table 9.

Test I Interpretation of Results. The results did not support Test I overall. Rejection of three null hypotheses occurred where two categories were adjacent to each other. This means that there are similarities in perceptions of conflict. However, there were no rejections of null hypotheses for categories not adjacent to each other. From the viewpoint of the entire life-cycle, the pattern of rejection indicates that perceptions of conflict change over the entire life-cycle, but at a rate which does not demonstrate significant differences between adjacent categories. This trend and non-support of Test I lends support for Research Hypothesis I. Further interpretation of dissimilarities between categories will be discussed in the interpretation of the Research Hypothesis I findings.

Test II. The intensity of each source of conflict experienced by SPO managers does not differ among specific interfacing groups.

The objective of this test was to determine whether differences in conflict intensities varied between the six interfacing groups for the seven sources of conflict. The rankings for the conflict sources indicate where similarities exist between specific interfacing groups within the military environment.

Table 9

Similarities and Dissimilarities of Ranked Sources of Conflict
Between Categories

CATEGORIES ¹	KENDALL TAU	PROBABILITY OF OCCURRENCE UNDER H ₀	$\alpha = .05$	
			CANNOT REJECT	REJECT
I & II	.878	.003		X
I & III	.524	.051	X	
I & IV	.333	.147	X	
II & III	.683	.017		X
II & IV	.488	.064	X	
III & IV	.809	.005		X

¹Categories refer to life-cycle phases/stages described on page 44.

The relative intensities of the seven sources of conflict were ranked from one to seven for each of the specific interfacing groups with the highest relative intensity having the rank of one (See Table 10). Test II was analyzed using null/alternate hypothesis tests of Kendall Tau between the rankings by specific interfacing groups.

Null Hypothesis, H_0 : The rankings disagree.

Alternate Hypothesis, H_1 : The rankings agree.

The results of the null/alternate hypothesis tests are presented in Table 11.

Test II Interpretation of Results. Test II was not supported by the null/alternate hypothesis tests, five out of fifteen tests having rejected the null hypothesis. However, from the viewpoint of the organizational relationships between the SPO managers and the interfacing groups, the results of the hypothesis tests revealed an aggregation of the interfacing groups. These represented three organizational classes existing internally and externally to any particular program within ASD. The internal class included subordinates, assigned personnel, and other SPO members, all of whom could fall directly under the SPO manager's supervision or influence. The external class included functional departments, superiors, and other SPO members, all of whom belong to ASD (the parent organization), but not under the direct control of the SPO manager.

Table 10

Ranked Sources of Conflict by Interfacing Groups

INTERFACING GROUP ²	SOURCES OF CONFLICT						
	PROGRAM PRIORITIES	ADMINIS-TRATIVE	TECHNICAL ISSUES	MANPOWER RESOURCES	COST OBJECTIVES	SCHEDULES	PERSONALITY
SUBORDINATES	3	2	1	5	7	4	6
ASSIGNED PER-SONNEL	1	3	2	4	7	5	6
FUNCTIONAL DEPARTMENTS	2	3	5	1	6	4	7
SUPERIOR	3	2	4	1	6	5	7
OTHER SPO MEMBERS	1	2	4	3	6	5	6
CUTSIDE AGENCIES	1	4	3	6	4	2	7

¹The relative intensities of seven sources of conflict were rank ordered one through seven by interfacing groups with the highest relative intensity having the rank of one.

²Interfacing groups are described in more detail on page 46.

Table 11

Similarities and Dissimilarities of Ranked Sources of Conflict Between Interfacing Groups

CLASS	INTERFACING GROUPS	KENDALL TAU	PROBABILITY OF OCCURRENCE UNDER H_0	$\alpha = .05$	
				CANNOT REJECT	REJECT
INTERNAL (GROUPS UNDER DIRECT SPO MGR CONTROL)	SUBORDINATES & ASSIGNED PERS. OTHER SPO MEMBERS & ASSIGNED PERS.	.71 .78	.01 .01		X X
	FUNCTIONAL & SUPERIORS OTHER SPO MEMBERS & FUNC- TIONAL DEPARTMENT OTHER SPO MEMBERS & SUPER- IORS	.91 .68 .68	.01 .02 .02		X X X
OTHER COMPARISONS BE- TWEEN INTERNAL AND EXTERNAL CLASSES	SUBORDINATES & FUNCTIONAL SUBORDINATES & SUPERIORS SUBORDINATES & OTHER SPO MEMBERS	.14 .33 .48	.33 .35 .06	X X X	
	ASSIGNED PERS. & FUNCTIONAL ASSIGNED PERS. & SUPERIORS	.43 .43	.09 .09	X X	
	OUTSIDE AGENCIES & SUBORD- INATES OUTSIDE AGENCIES & ASSIGNED PERS.	.33 .43	.15 .09	X X	
	OUTSIDE AGENCIES & FUNC- TIONAL DEPARTMENT OUTSIDE AGENCIES & SUPERIORS OUTSIDE AGENCIES & OTHER SPO MEMBERS	.24 .05 .29	.23 .44 .18	X X X	

Note that the other SPO members group can belong to either the internal or external group, depending on the type of SPO or the situation. The other class included outside agencies which are totally external to the ASD work environment.

For internal classes, the three interfacing groups were compared with each other and they rejected the null hypotheses indicating similarities (See Table 11). Also, comparisons of these three groups with other interfacing groups did not reject the null hypotheses indicating dissimilarities. Assigned personnel, normally collocated with the SPO manager, are apt to be more dedicated to the program than those not directly assigned to the program. Thus, the SPO manager's perception of conflict for subordinates and assigned personnel would tend to be similar as the hypothesis tests indicated. Likewise, the SPO manager's perception of conflict with other SPO members within the same program can be expected to be similar.

Distinct from the internal program class was the external class within ASD which included superiors, functional departments and other SPO members. The SPO manager may be dependent upon any one of these interfacing groups for support or resources in contrast to the internal class over whom the SPO manager can probably exercise direct supervision or influence. Like the internal class, the external classing was supported by rejection of the null hypotheses indicating similarities with the SPO manager's

perception of conflict.

The only interfacing group which could not be classified with either the internal or external classes was outside agencies. The null hypothesis was not rejected in any of the tests indicating dissimilarities in the SPO manager's perception of conflict with the other class (See Table 11).

The non-rejection of the null hypotheses which included outside agencies indicates a totally different set of orientations for this interfacing group. The goals or orientations of outside agencies may not be consistent with the goals that SPO managers are attempting to achieve within the program work environment.

To summarize, the Test II results indicated a combination of support and non-support for the null hypothesis, but did not support the Test overall. There are distinct differences between the rankings of the seven sources of conflict within the three classes of: (1) personnel working under the SPO manager's supervision; (2) personnel within ASD upon which the SPO manager may be dependent; and (3) outside agencies. Some of these differences will be discussed in the interpretation of the results in Research Hypothesis I.

Test III. The conflict resolution modes used by SPO managers do not differ among specific interfacing groups.

The objective of this test was to determine whether or not the SPO manager used different modes of

conflict resolution to deal with the same three interfacing groups that Thamhain and Wilemon had used in their study. For this reason, the outside agencies interfacing group was excluded from the test.

The five conflict resolution modes were ranked from one to five for each of the three interfacing groups, with the most often used of the five modes having the rank of one. The three interfacing groups were program personnel (which included subordinates, assigned personnel, and other SPO members), functional departments, and superiors. Test III was analyzed using three null/alternate hypothesis tests of Kendall Tau between the rankings for each interfacing group.

Null Hypothesis, H_0 : The rankings disagree.

Alternate Hypothesis, H_1 : The rankings agree.

The rankings for all three of the interfacing groups were the same as follows:

Ranking	Mode of Resolution
1	Confrontation
2	Compromise
3	Smoothing
4	Forcing
5	Withdrawal

The hypothesis tests yielded Tau values of 1.0, indicating complete agreement in rankings, and rejection of the null hypothesis with a 0.0 probability of occurrence under H_0 .

Test III Interpretation of Results. The complete agreement of the rankings and subsequent rejection of the null

hypothesis supported Test III that conflict resolution modes used by SPO managers do not differ among specific interfacing groups. However, several observations cast doubts upon the validity of the results. The data was obtained from the last question on the survey questionnaire (See question 14, Appendix A, page 125). The respondents were asked to determine the appropriateness of fifteen proverbs equated to five modes of resolution against three interfacing groups. The length of this question, following an already long and complicated survey, apparently resulted in a respondent tending to give each interfacing group the same ratings for each proverb. Construction of the instrument made it easy to standardize the answers in this manner.

A more meaningful comparison might have been to evaluate the use of conflict resolution modes in each of the program life-cycle categories. The trend of resolution mode usage over the four life-cycle categories is shown in Figure 6. This trend indicates that the SPO manager uses differing styles of management throughout the life-cycle of his program. In Category I, for example, the resolution modes used indicates a relatively high level of participative management. There is a decreasing tendency to use the forcing mode, and an increasing tendency to use the withdrawal and smoothing modes. However, as the program matures through Categories II and III, a trend towards a more authoritarian or formal

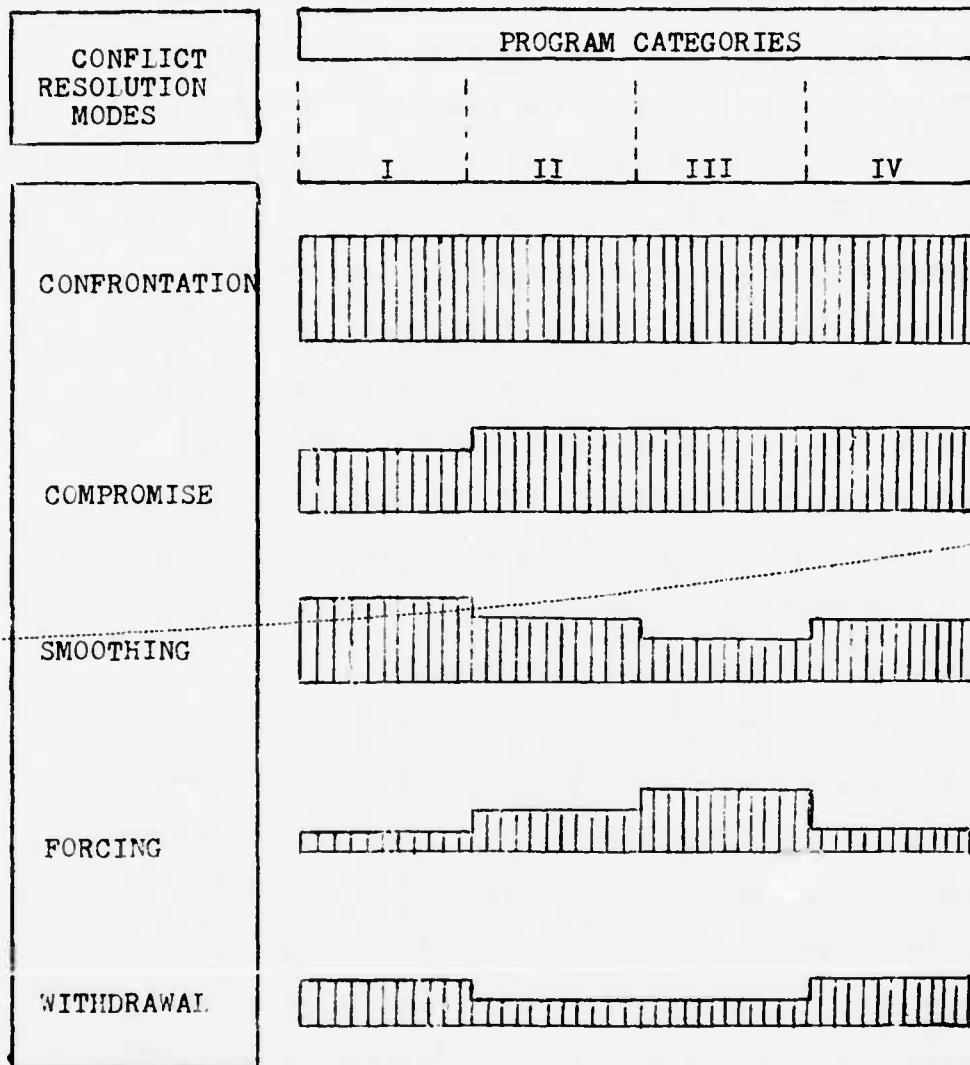


Figure 6. Trend of Conflict Resolution Modes Over the Four Life-Cycle Stages (Based on rank-ordered importance, 1 being highest usage and 5 being lowest usage).

style of management develops. The forcing mode usage increases, while smoothing and withdrawal show proportional decreases. Then in Category IV, a reversal occurs toward a more participative management style again. These findings of Larson and Ruppert in their 1975 thesis effort (32:57). Their study of SPO organizational climates across program life-cycle categories concluded that SPOs in Category I have a tendency to practice a form of participative management. As programs moved through Categories II and III, the SPO became a more formally structured organization. The reversal noted above in Category IV was also demonstrated in their thesis. This may be due to the fact that as the SPO becomes smaller, the SPO management typically becomes less functionally oriented in Category IV. Managers are again required to move more across organizational lines to accomplish their tasks and practice a style of participative management.

PART III. RESEARCH HYPOTHESIS ANALYSIS

Research Hypothesis I. There is no difference in the intensities of conflict experienced by SPO managers and civilian program/project managers for each program/project category.

By category, the relative intensities of the seven sources of conflict were ranked with the highest relative intensity having the rank of one. Similarly, the civilian rankings were derived from the Thamhain and Wilemon study (See Table 12). Research Hypothesis I was analyzed using null/alternate hypothesis tests of Kendall Tau between the

civilian and SPO managers by categories.

Null Hypothesis, H_0 : The rankings disagree.

Alternate Hypothesis, H_1 : The rankings agree.

The results of the null/alternate hypothesis tests are presented in Table 13.

Hyp. I Interpretation of Results. The differences in the trends and intensities of conflict experienced by SPO managers and civilian program/project managers can be clearly shown in Figures 7 through 13. The findings did not support the Research Hypothesis that the conflict intensities within civilian and military life-cycle categories were similar. The overall findings of the conflict intensities over a SPO program's entire life-cycle are summarized below in rank-ordered sequence:

1. Conflict over Program Priorities
2. Conflict over Technical Opinions and Performance Tradeoffs
3. Conflict over Administrative Procedures
4. Conflict over Manpower Resources
5. Conflict over Schedules
6. Conflict over Cost Objectives
7. Personality Conflict

1. Conflict over Program Priorities. In civilian programs/projects, priorities tend to be a form of conflict most likely to occur early in the life-cycle. According to Thamhain and Wilemon, numerous program/project managers had indicated that this type of conflict frequently developed in the initial categories because the organization's functional departments had no prior experience with a project undertaking (56:34). Thus, priority conflicts often

Table 12
Ranked Sources of Conflict by Type Program Manager and Category

CATEGORY	TYPE PROGRAM MANAGER	SOURCES OF CONFLICT ¹						
		PROGRAM PRIORITIES	ADMINISTRATIVE	TECHNICAL ISSUES	MANPOWER RESOURCES	GOAL OBJECTIVES	SCHEDULES	PERSONALITY
I	CIVILIAN	1	2	6	4	5	3	7
	SPO MANAGER	2	5	3	1	6	4	7
II	CIVILIAN	1	3	4	5	7	2	6
	SPO MANAGER	1	5	3	2	6	4	7
III	CIVILIAN	4	5	2	3	6	1	7
	SPO MANAGER	1	2	3	4	6	5	7
IV	CIVILIAN	4	7	6	3	5	1	2
	SPO MANAGER	1	2	4	5	6	3	7

¹The relative intensities of seven sources of conflict were rank ordered one through seven by civilian and SPO managers for each category with the highest relative intensity having the rank of one. For the civilian manager, Figure 3, page 34, was used.

²Category refers to life-cycle phases/stages described on page 44.

Table 13

Similarities of Ranked Sources of Conflict Between Civilian and SPO Managers

CATEGORY ¹	TYPE PROGRAM MANAGER	KENDALL TAU	PROBABILITY OF OCCURRENCE UNDER H ₀	$\alpha = .05$	
				CANNOT REJECT	REJECT
I	CIVILIAN & SPO MANAGER	.33	.15	X	
II	CIVILIAN & SPO MANAGER	.48	.06	X	
III	CIVILIAN & SPO MANAGER	.10	.38	X	
IV	CIVILIAN & SPO MANAGER	-.24	.23	X	

¹Category refers to life-cycle phases/stages described on page 44.

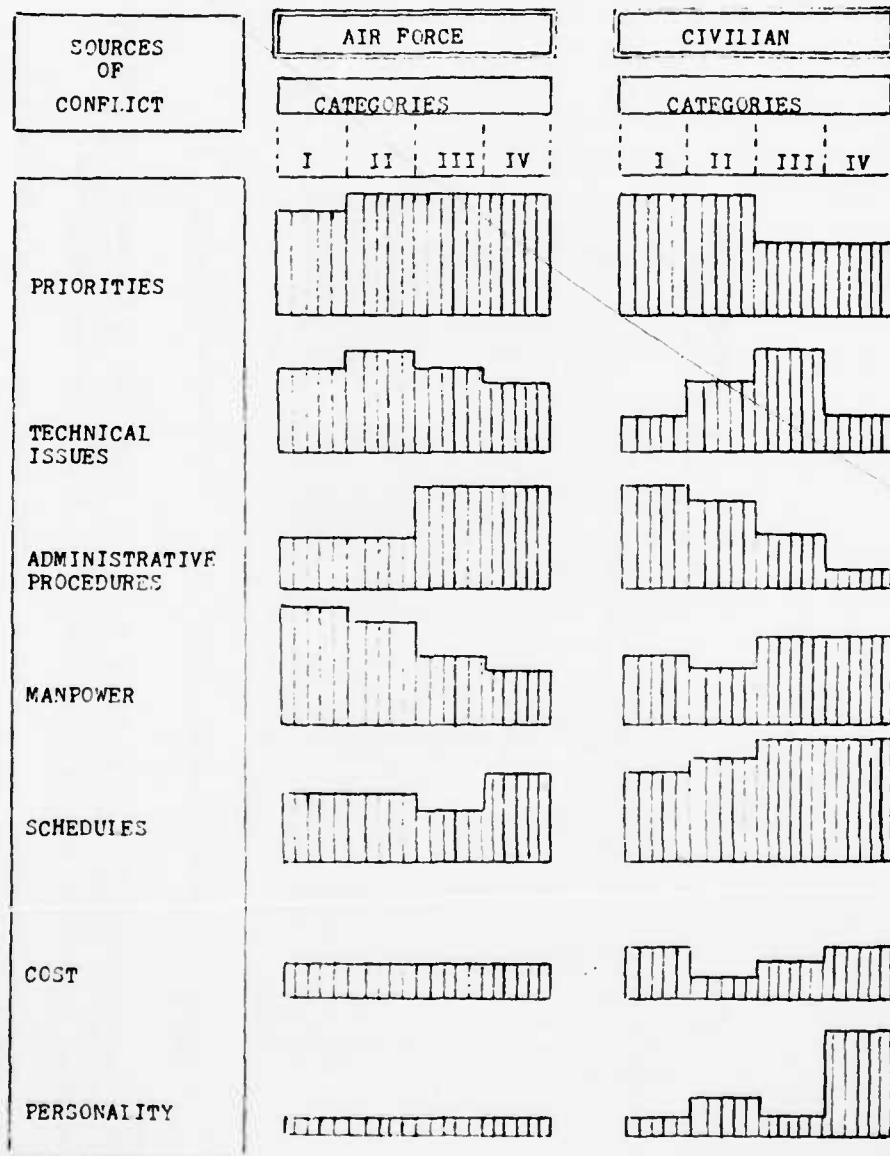
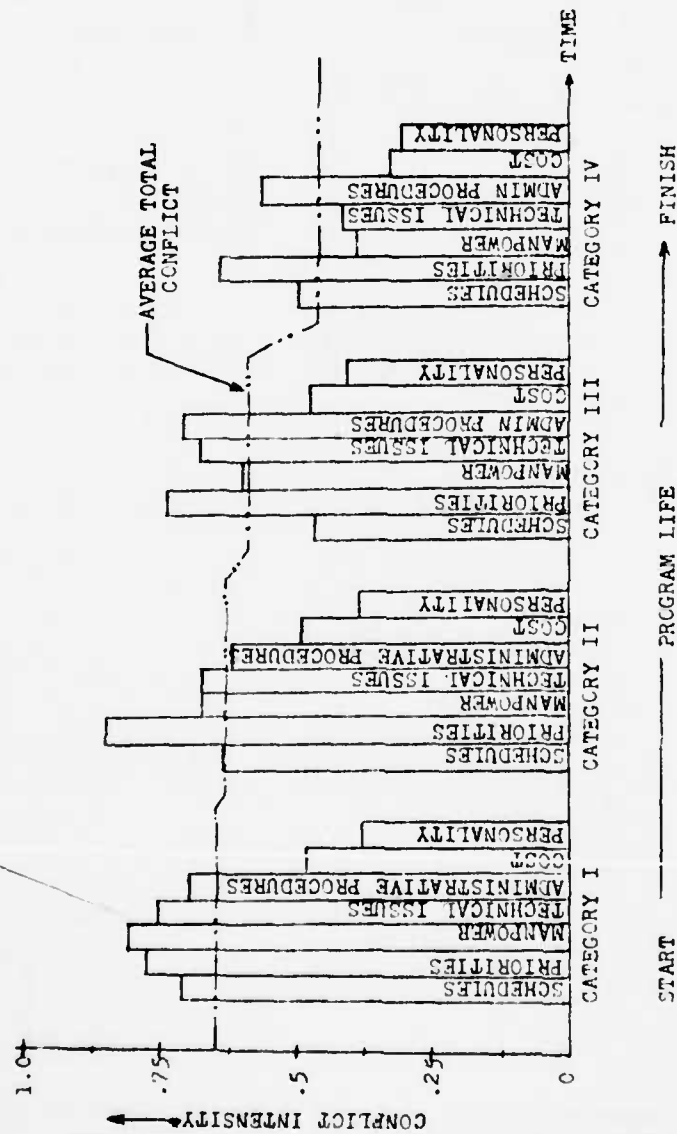


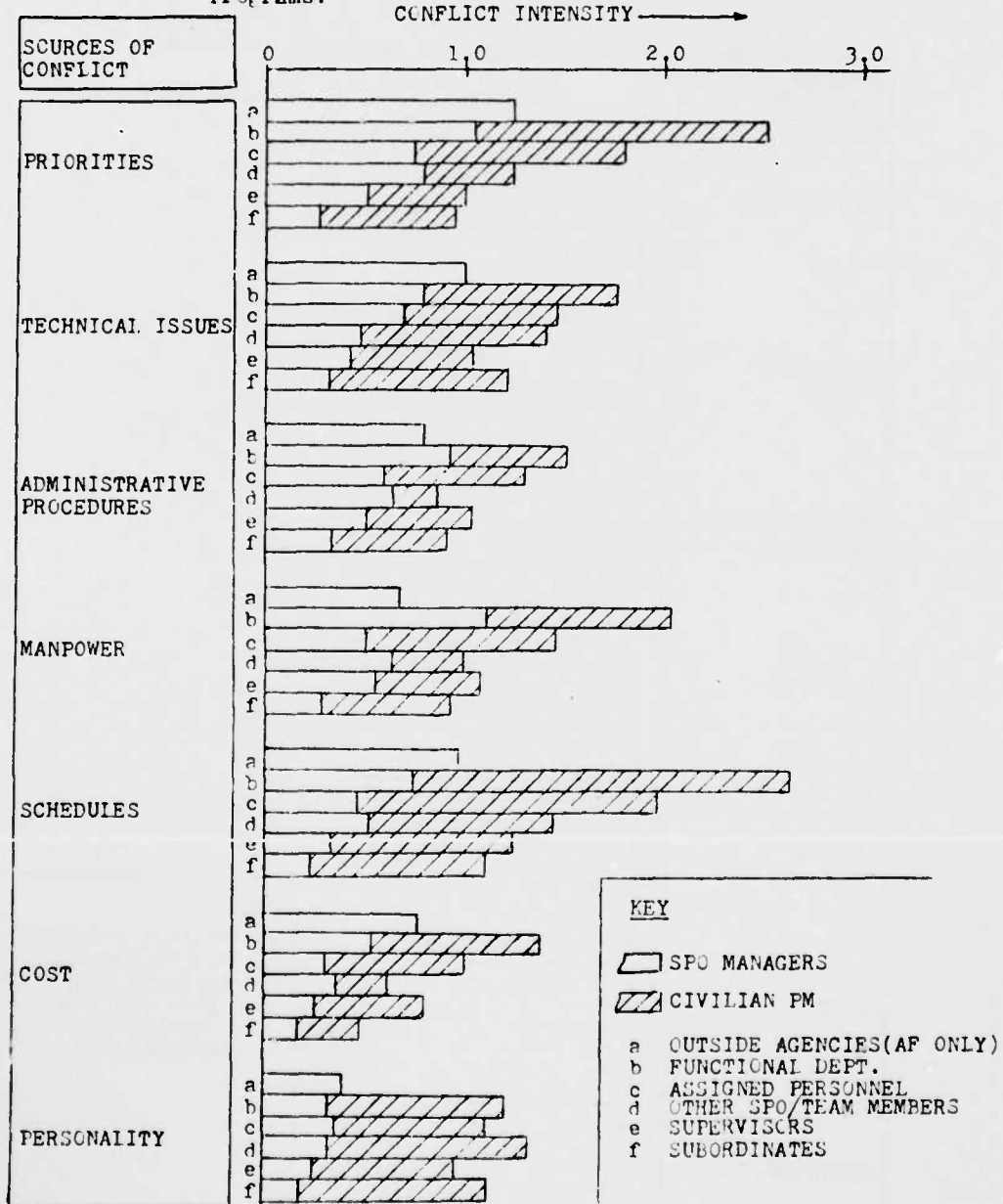
Figure 7. Comparison of the Trends of Conflict Source Intensities Over the Four Life-Cycle Categories in Air Force Programs and Civilian Program/Projects (Conflict Profiles are Based on the Rank-Ordered Trends).



*The Conflict Intensity for each conflict source was calculated by averaging the conflict intensities of the six interfacing groups within a category. See Figures 10 through 13 for conflict intensities of each interfacing group within the four categories.

Figure 8. Relative Intensities of Conflict Over the Life-Cycle of Air Force Programs

Figure 9. Comparison of the Relative Intensities of Conflict Over the Total Life-Cycle of Air Force and Civilian Programs.



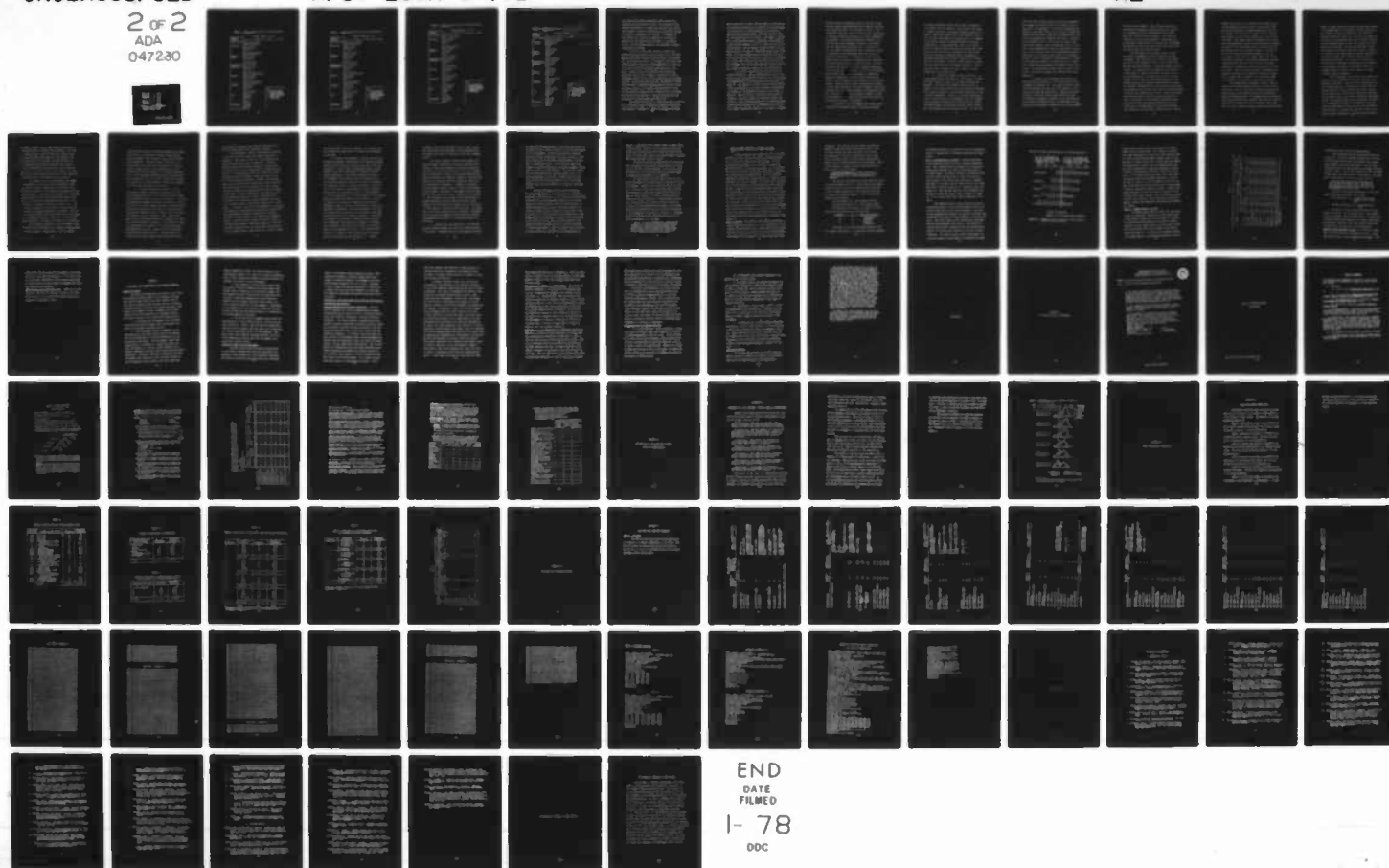
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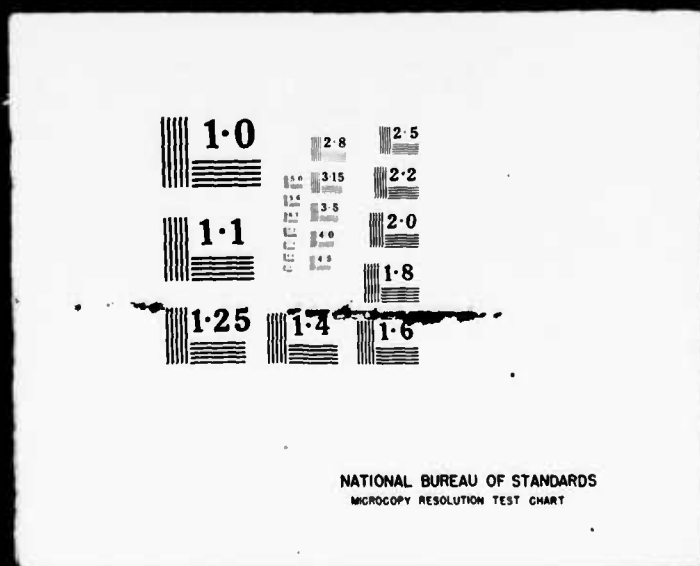


Figure 10. Conflict Intensity Profile of Interfacing Groups in Category I.

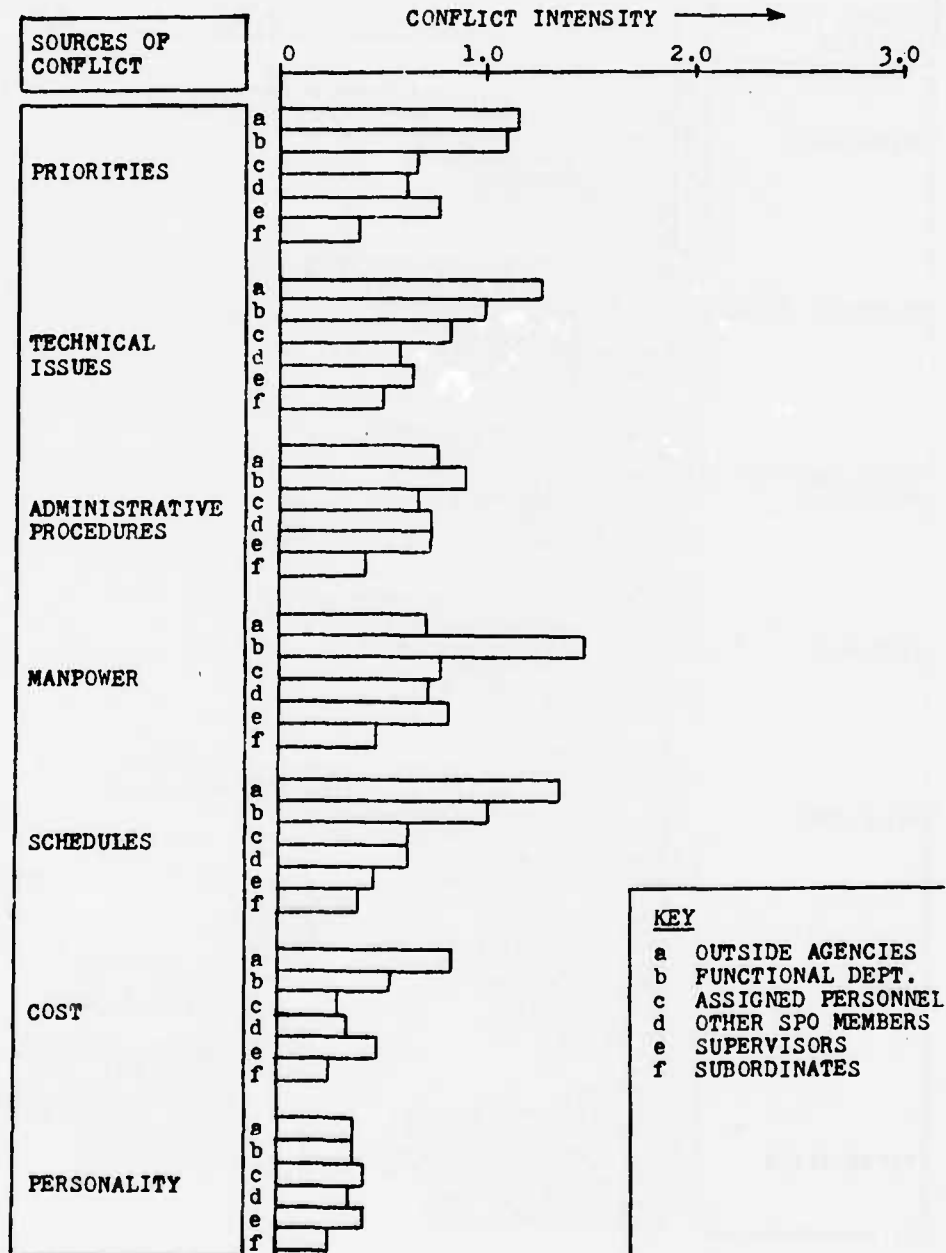


Figure 11. Conflict Intensity Profile of Interfacing Groups in Category II.

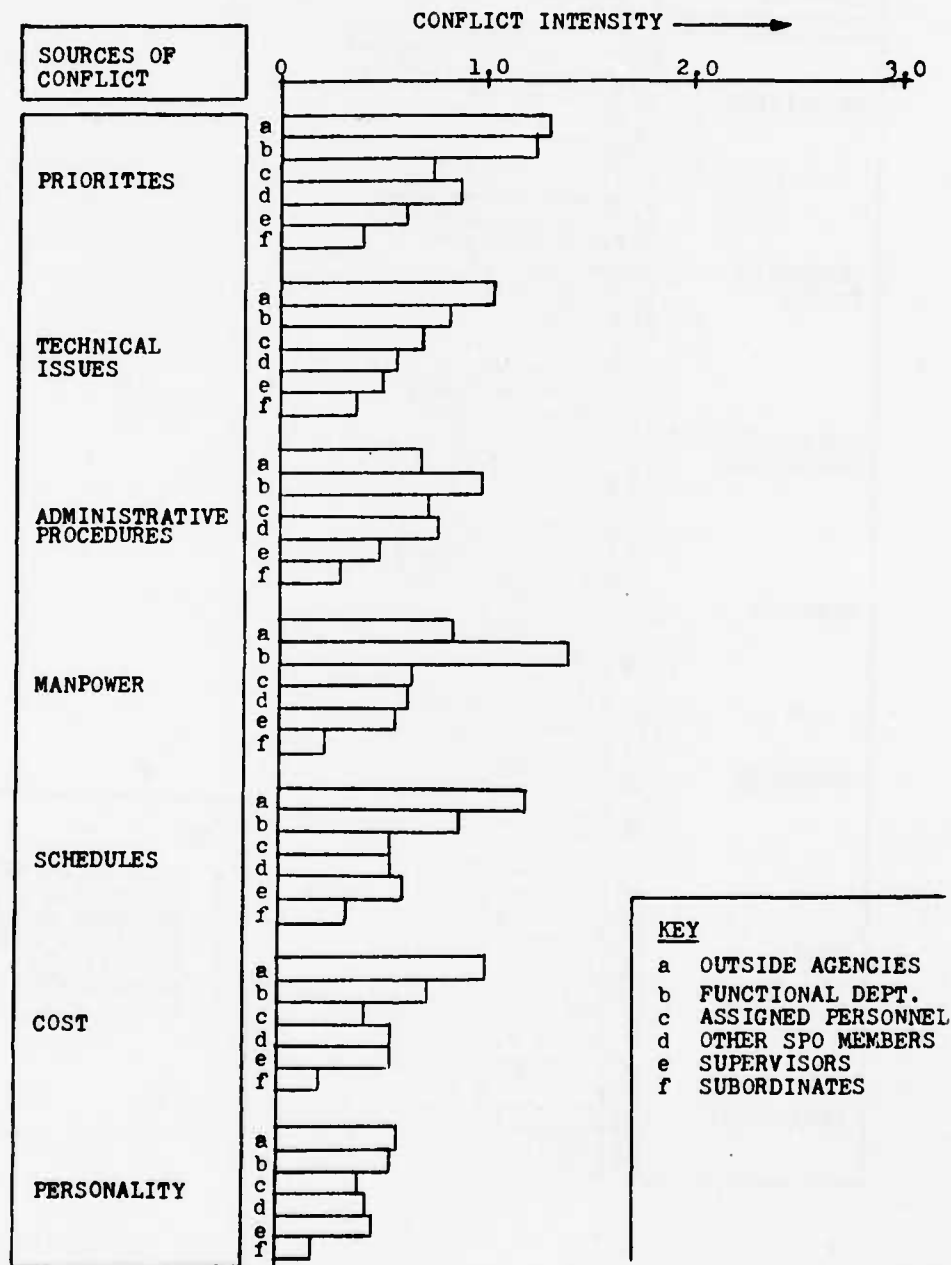


Figure 12. Conflict Intensity Profile of Interfacing Groups in Category III.

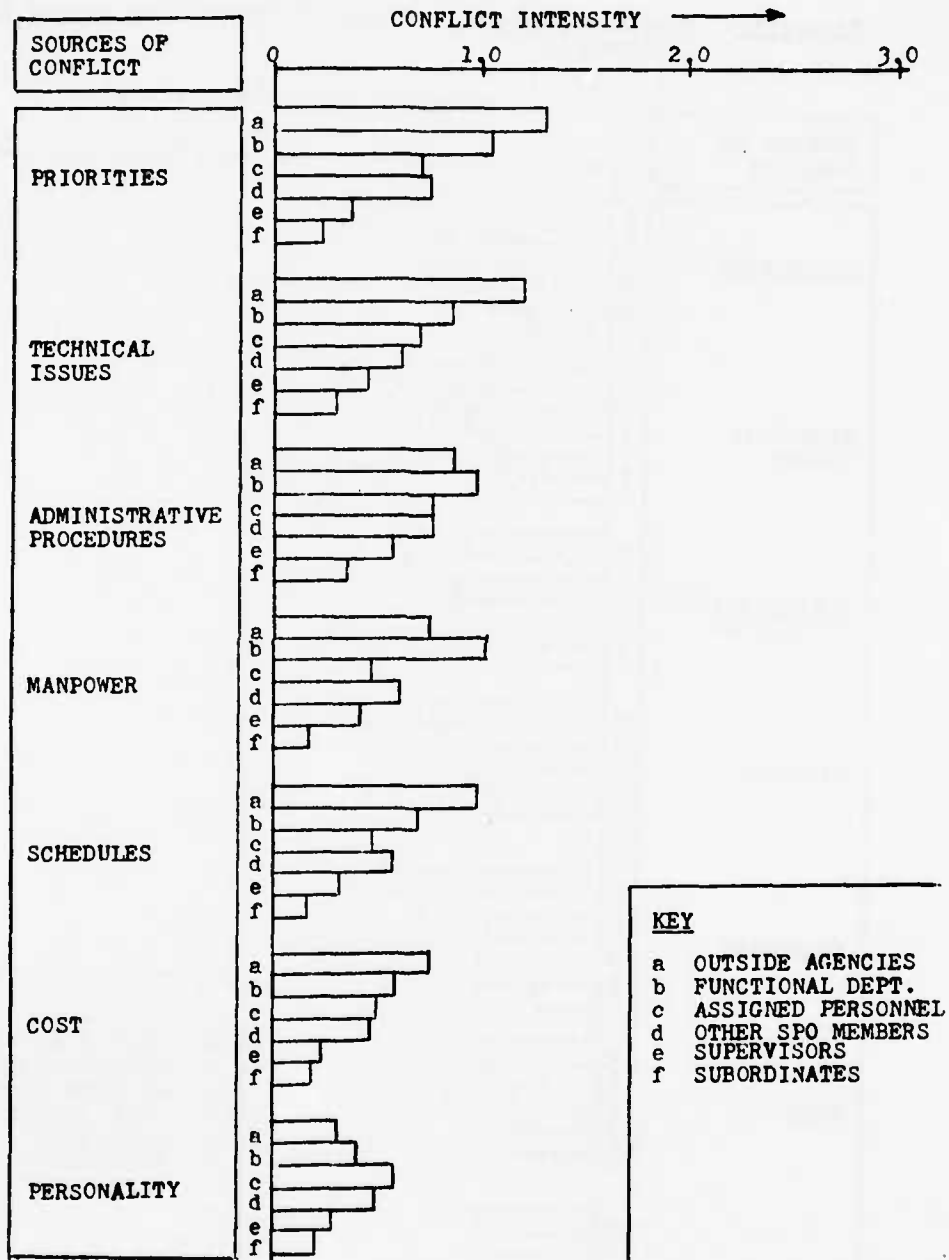
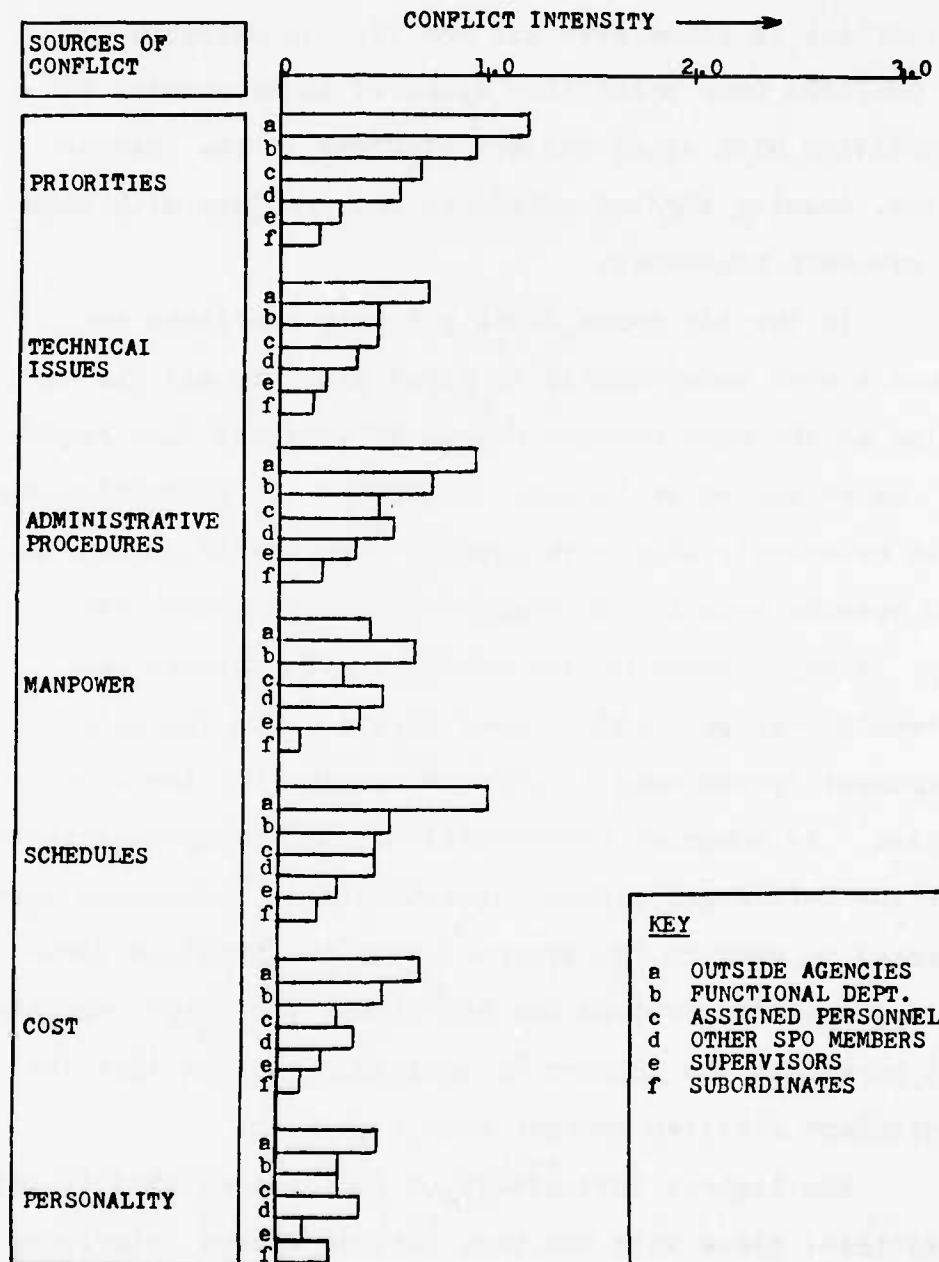


Figure 13. Conflict Intensity Profile of Interfacing Groups in Category IV.



took place with support departments whose established schedules and work patterns stood to be disturbed by the changed requirements of supporting a project. The priorities tended to decline in importance as a principal source of conflict in Categories III and IV. In Category IV, the conflict over priorities appeared to be related to competition with other project startups in the organization, causing tighter schedules and problems with sharing manpower resources.

In the Air Force SPOs, priority conflicts remained almost consistently in first place in all the categories as the most intense source of conflict (See Figure 8). As evidenced by Figures 10 through 13, priorities were rated relatively high with support departments as well as with outside agencies throughout each life-cycle category. A major cause of the conflict with support departments over priorities seems to stem from the matrix management system used to provide manning for the programs studied. In numerous conversations, SPO managers inferred that the better procurement specialists and engineers were selected to work in the programs with the greatest visibility, causing problems for the "lower priority" programs. This parallels the problem of limited resources that the counterpart civilian manager must cope with.

The highest intensities of conflict related to priorities takes place with the many outside agency interfaces (See Figures 10 through 13). Many SPO managers indicated

that a great deal of their time was spent in continuously justifying and defending their programs to the many agencies upon which the program depended on for survival. Every military program manager lives with the fact that his own program may not be funded, so he expends a great deal of energy advocating the importance of the program to gain funding support (23:177-9). From the very first program phases, the SPO manager strives to make his program a reality in terms of a definable and product. However, if the SPO manager spends too much time with priority issues with outside agencies, he may end up spending too little time in prioritizing the work effort within his program. This in turn may cause additional conflicts with other SPO members, supervisors, and subordinates.

2. Conflict over Technical Opinions and Performance Tradeoffs. Civilian managers seem to face conflicts in this area that are proportional to the resource commitment trends to the program/project (See Figure 2, page 33). The intensity of this conflict source reaches a peak in Category III, and then decreases considerably in Category IV (See Thamhain/Wilemon results, Figure 7, page 77). The low conflict intensities experienced in Category I may occur because the technical aspects are primarily in the planning stages. As the program/project progresses into Category II, disagreements may develop with support departments relative to the level of support.

Perhaps technical requirements have not been met, or perhaps the support department may wish to maximize the technical input for which it is responsible (56:39). This maximization may cause conflict with the cost, performance, or schedule objectives previously set by the program/project manager. The support departments normally do not hold the same broad management overview of the effort that the program/project manager does. Restraints in cost or schedule parameters may lead to quicker or cheaper alternatives and disagreements may arise over the technical alternatives. In Category III, the civilian manager faces the problem of integrating the various project subsystems, possibly for the first time. Conflicts frequently develop due to a lack of proper integration, or a poor technical performance of one or more subsystems which directly affect other components or subsystems. Numerous disagreements may arise over reliability and quality control standards, design problems, or testing procedures. Problems such as these occurring during production can cause backlogs or even work stoppages, and intense conflicts can be generated throughout the organization (56:40). When the program/project reaches Category IV, most of the technical issues have been resolved, and this conflict source decreases in importance.

In contrast, the SPO manager faces a great deal of conflict over technical issues in the earlier program

life-cycle categories, which reach a peak in Category II (See Figure 7 for SPO results). This conflict then tends to steadily decrease in importance through Categories III and IV. This may be partly due to the extensive "front-end" research, development, and testing which is conducted on new weapon systems or components prior to production authorization. During Categories I and II, an intense effort is made to reduce the risks and uncertainties which may be associated with the introduction of a new system. The users and support departments may be attempting to maximize performance and technical aspects of the system, while the SPO manager is trying to make tradeoffs in these areas to stay within cost or schedule objectives. These conflicts must be largely resolved by the time actual production of the system begins.

3. Conflict over Administrative Procedures. Although ranked high by SPO managers, this source of conflict was rated rather low overall by civilian program/project managers. As shown by the Thamhain/Wilemon results in Figure 7, the conflict profile for administrative procedures begins high in Category I and decreases dramatically as the life-cycle progresses. Conflict in civilian organizations occurs in this area due to disagreements over the program/project manager's authority and responsibilities, reporting relationships, administrative support, status reviews and interorganizational interfacing (56:36). For the most

part, this area involves issues over how the program/project manager will function and how he relates to the organization's top management. The civilian program/project manager in most cases enjoys a role as part of higher management with very little layering of management above him. Civilian program/project managers were found to normally have an average of two to five bosses, and these supervisors were normally on the vice-president levels (53:53). Most of the administrative issues are negotiated in Category I, and a detailed outline of operating procedures is developed to be followed in the conduct of the program/project. Usually a statement of understanding or a charter describing the breakout of responsibilities is signed by all participating program/project members at the very outset. This arrangement probably reduces potential conflicts in this area throughout the remaining life-cycle categories.

In contrast, the SPO manager views conflict in administrative procedures as a continuous central issue throughout the program life. This area was noted by some survey respondents as being the most disruptive in the normal day-to-day work environment. Comments relating to problems in this area focused around four main causes: the layering of management inherent in DOD organizations, the ASD matrix management system, the performance rating system, and the geographic separation from the end product.

As can be seen in Figure 7, the conflict profile of administrative procedures is exactly opposite the trend in the counterpart civilian program/project environment. Where this conflict has been reduced in the latter two categories for the civilian manager, it has become the second highest ranked conflict source for the SPO manager. The reasons for this can be seen by analyzing each of the four causes that were mentioned above.

The SPO manager has a greater number of bosses and layers of management to satisfy than his civilian counterpart. The SPO manager may interface with upwards from ten to forty different bosses or staff agencies who have the necessary authority to influence program decisions (53:56). As a result, the SPO manager is constrained by a large number of imposed directives, policies, and reporting requirements. The acquisition policies and procurement tools to carry out these requirements are established by people not directly concerned with the success of a program. Responsibilities and authority for the major policy-making and monitoring activities are diffused throughout DOD and the services at all levels. Within this framework, many can say no, but few can say yes and make it stick. In addition, the SPO manager has problems effectively exercising his delegated authority and responsibilities due to the high number of staffs and reviewing boards which must be kept fully informed (26:12). The SPO

manager spends much of his limited time in formal reporting and presentations which serve no other purpose than keeping various levels of higher headquarters informed on his program. The civilian counterpart likewise performs these functions, but to fewer people and in a more informal manner. With fewer layers of management and a lesser reporting requirement, the civilian program/project manager has a great deal more latitude over his time and the way he approaches the decision-making process. A direct result of the numerous reporting procedures in the SPO environment is the need for a larger staff. Due to the "fishbowl" environment in DOD program management, the SPO Program Directors may not think in terms of voluntary elimination of personnel positions in Categories III and IV (54:65). With the extensive layers of management continuously checking on the program's efficiency of operation, a large staff is needed just to handle the mandatory, otherwise non-productive reporting requirements.

The expanded matrix management system in ASD appears to have caused increased conflicts to arise in its application. The use of pooled centralized resources can cause conflicts in how these resources are distributed among the competing needs. SPO managers took the viewpoint that it was difficult for a required specialist to function unless he was working for the SPO Director, rather than for two bosses. Many SPO managers indicated that the large

number of change orders and program peculiarities inherent in any program makes it necessary to control program control experts, procurement specialists, and others who have been "matrixed" within ASD. Yet this is contrary to the theory of program management which indicates that the military program manager's outlook was a great deal more functionally oriented. The opposing functional department viewpoint is that the peaks and valleys of specialist workloads allows the centralized matrix organization to maintain better control and more efficient use of the manpower resources. It also serves the purpose of providing better training, standardization, and tracking of the hundreds of aspects in the Armed Services Procurement Regulations, which control nearly all aspects of weapon system procurements.

Some SPO managers indicated that there remains an absence of uniform standards by which to evaluate a SPO manager's performance. The new Officer Effectiveness Reports (OERs) may lead to optimization of short-term successes even more so than under the older rating system. The new system uses a quota system under which only 22% of the officer corps is allowed an outstanding performance report. This yearly report places a great deal of emphasis on comparing an officer's accomplishments with his peer's accomplishments within the same work environment and time frame. Long term goals and ideas such as Life-Cycle Costing considerations, which may acutely affect a

program's overall success, may suffer by receiving less than their share of interest and enthusiasm. This may be primarily due to the fact that these benefits are gained long after the program has been deployed into the field and the SPO manager is interested more in receiving and outstanding performance report that is based on the shorter term successes of the initial acquisition. The point is that the SPO managers will probably have been transferred from the SPO long before the long term problems start showing up in the field.

In contrast, a civilian program/project manager is encouraged to look at the long term benefits which may result in higher company gains by such actions as follow-on contracts, or new technology breakthroughs with a market demand. The civilian counterpart has no definite career pattern to worry about like the SPO manager does since his position as a program/project manager is probably just a broadening experience for him (53:67). The civilian's assignment is based upon his previous experience and he is generally regarded as an expert. His job security results more from the stability acquired throughout his background and less on the basis of written performance reports to determine his future work assignments.

The geographic separation of the SPO manager from the actual end product that he is striving to manage causes conflicts in terms of communication. The SPO managers

indicated that they were completely dependent upon either the Air Force or governmental contract administration agency assigned to the contractor's facilities for hardware information. They had indicated that there is a lesser chance of face-to-face confrontation to resolve conflict issues as most of the communication ends up taking place over the telephone or in written correspondence. The SPO managers indicated that they desired real-time information, but if the plant contract administrator is responsible for various aspects of many other programs in the facility, this may not be possible.

4. Conflict over Manpower Resources. Here is seen another situation where the conflict profile over the program/project life follows an almost opposite trend from the Thamhain/Wilemon results (See Figure 7). Civilian program/project managers noted that most conflicts associated with this source occurred with those departments which either assign personnel to the effort or support the program/project internally (56:36). Again, as with conflict over technical issues, Categories I and II are used to plan the use of manpower resources for Category III, where the need for manpower is greatest. If the functional support departments are responsible for supporting several programs/projects at once, severe strains over manpower availability may develop (56:41). During Category IV, conflict over manpower remains high possibly due to new

program/project startups, which creates competition for personnel during the critical Category IV stages.

For SPO managers, conflict over manpower resources is the conflict source having the highest intensity in Category I. This may be in part due to the manpower problem that faces every newly conceived SPO. A new SPO Director may be faced with the problem of finding qualified personnel who can be released for his immediate needs (54:51). In the beginning of most SPO formations, there are rarely sufficient numbers of qualified personnel to fill the validated requirements. However, once the manpower slots are filled and the personnel system stabilizes the turnover rate, the SPO manager may not face as many problems of getting the support personnel that are needed in the latter life-cycle categories. The decreasing conflict intensities may also be partly explained by the fact that the SPO functional support departments are set up in a matrix system to specifically support the SPO managers. In contrast, the functional department in a civilian organization may be permanent functional work groups, with the program/project manager representing an infringement and a possible threat to the traditional management system. In the Air Force, however, the matrix system is the traditional system. Furthermore, many SPOs often successfully establish their own "functional" sub-divisions such as program control, engineering, etc., that are under

the direct control of the SPO Director. As a result, conflict intensities would tend to be lower for SPO managers in this area.

5. Conflict over Schedules. For the civilian program/project manager, disagreements over schedules provides the most intense conflicts over the total life of the program/project. Many of these disagreements develop during Category I over the establishment of schedules with the support departments. The support departments may have to accommodate newly formed projects by adjusting their own scheduled operations, which may already be overtasked. This adjustment process is highly susceptible to conflict since it may involve a reorientation of present operating patterns and local priorities (56:37). During Category II, conflict may develop over the enforcement of the schedules agreed upon during the negotiations in Category I (56:39). In Category III, meeting the support-oriented schedule commitments becomes critical to the effective overall program/project performance. The interdependency of the various support groups responsible for the numerous subsystems frequently gives rise to schedule slippages. As previously discussed in the technical conflict section, problems with integrating subsystems cause slippages in schedules which may affect other groups if they are on the critical path of the program/project (56:40). The conflicts with schedules in Category IV are associated with scheduling problems that carry over from Category III. Schedule

slippages often become cumulative and the impact becomes most severe during the phasedown of the program/project as efforts are devoted to tying the "loose ends" together (56:41).

For the SPO manager, conflict with schedules are usually related to defining the product, reducing uncertainties in the early categories, getting the production go-ahead, and delivering the product to the user commands. Each of these areas is based on a milestone approach that closely scrutinizes the program's progress. Conflict with schedules is associated with the conflicts in priorities and administrative procedures. Slippages in schedules can mean higher production costs or possible cancellation of the program, if excessive. The highest conflict intensity for this source was noted in Category IV (See Figure 7). This probably occurs because of the preponderance of boundary spanning activities that exist with the user commands, Air Force Logistics Command, and the contractors as a new system is transitioned into the field. The schedules of the outside agencies must be carefully coordinated with the production schedule as they become more closely interdependent with respect to training and support requirements.

6. Conflict with Cost Objectives. Civilian and military program managers are faced with similar problems in this area. Disagreements over cost frequently develops

for the civilian manager when he negotiates with other departments who will perform subtasks on the program/project. As the SPO managers, civilian program/project managers with tight budget constraints often try to minimize costs while support groups may want to maximize their involvement of the budget (56:36). Also, conflicts may occur because of technical problems or schedule slippages, which tend to cause cost growth problems. In both the civilian and military environments, cost was surprisingly not a major determinant of conflict. It seems that most problems in this area develop gradually over time and may provide little basis for arguments as they are occurring (56:42).

The main difference between civilian managers and SPO managers seems to be in the area of adjusting to higher than predicted costs. If the costs for the civilian program/project are higher than projected, the civilian manager can usually provide sufficient justification of derived company financial and non-financial benefits to obtain the needed addition funding in short order. However, this is not the case for the SPO manager due to the higher number of bureaucratic constraints and the greater dollar values involved. The government procedures for obtaining additional funds are strict and were designed to protect public monies. The SPO manager has less flexibility and authority than the civilian program/project

manager in this area as he operates under a budget fixed by legislation. Since all of the program participants within the SPO environment may realize the restrictions placed on costs, there seem to be very few major conflicts that arise over this conflict source.

It must be stressed, however, that the conflicts over cost that do exist are important concerns for both the civilian and military manager. In both cases, cost performance is one of the key evaluation measures used in judging the performance of the manager.

7, Personality Conflict. This source of conflict was ranked low in intensity for both SPO and civilian managers. However, these conflicts tend to be the most difficult to deal with effectively. This problem was discussed as part of the Evan research finding on page 24 of this thesis. As noted, interpersonal conflicts are the most difficult to manage because they do not lend themselves as readily to rational analysis. For the civilian program/project managers, the highest intensity of personality conflict occurred in Category IV (See Thamhain/Wilemon results in Figure 7). Thamhain and Wilemon explained this increased personality conflict in Category IV in two ways:

First, it is not uncommon for project participants to be tense and concerned with future assignments. Second, project managers frequently note that interpersonal relationships may be quite strained during this period due to the pressure on project participants to

meet stringent schedules, budgets, and performance specifications and objectives [56: 41] .

To put it another way, towards the end of the program/project life civilian program/project participants are worried about their future job security. If the program/project manager is not willing to release the participant when a job becomes available, the team member has decreased chances of obtaining a meaningful, important job and may even face unemployment. The civilian program/project member has a great deal more at stake in this area than does the SPO manager. For example, the cancellation of a major weapons system program may have different effects on the civilian and government workers involved in the program. The government SPO program members would probably be simply transferred to other on-going programs and there would probably be no great concern over future job security. On the civilian side of the problem, however, workers would most likely be laid off by the thousands and a great deal of personal loss would be realized. All these considerations tend to cause higher conflict intensities in the civilian program/project environment (See Figure 9).

Hyp. I Summary. To summarize, the Research Hypothesis I results indicated support for the null hypothesis test indicating that differences exist between the relative rankings of the sources of conflict for civilian program/project managers and SPO managers in each of the life-cycle

categories. The findings did not support the Research Hypothesis that the conflict intensities within civilian and military life-cycle categories were similar. An examination of Figure 9 showed that conflict intensities for every source of conflict were significantly higher in the civilian program/project environment. Additional analysis in support of this significance can be found in Part IV of this Chapter.

Research Hypothesis II. There is no difference in the use of conflict resolution modes by SPO managers and civilian program/project managers.

The conflict resolution modes were ranked by civilian and SPO managers from one to five with the most appropriate resolution for a given situation having the rank of one. Research Hypothesis II was analyzed using the following null/alternate hypothesis test of Kendall Tau between the two ratings.

Null Hypothesis, H_0 : The rankings disagree.

Alternate Hypothesis, H_1 : The rankings agree.

The rankings of the modes of resolution for both the civilian and SPO managers were the same:

Ranking	Mode of Resolution
1	Confrontation
2	Compromise
3	Smoothing
4	Forcing
5	Withdrawal

The result of the null/alternate hypothesis test of a Kendall Tau value of 1.0 indicating complete agreement

in rankings resulted in a rejection of the null hypothesis, with a 0.0 probability of acceptance under the null hypothesis.

Hyp. II Interpretation of Results. Research Hypothesis II was supported by the rejection of the null hypothesis test. This indicated that SPO managers and civilian program/project managers use conflict resolution modes in a similar manner. To obtain a graphic illustration of the most and least important modes of conflict resolution, the top third of the rated scores were used to identify acceptance of the mode, and the lowest third of the scores were used to identify rejection of a particular mode (See Figure 14). This was the technique used by Thamhain and Wilemon to obtain the results shown in Figure 5 on page 36. Its use here allows for a direct comparison of results.

The Thamhain/Wilemon research study disclosed an interesting pattern in terms of the preferred conflict resolution modes used by the civilian managers. Over 70% of the program/project managers in the study indicated that confrontation was the most favored method of resolving conflict. This was followed by the compromising, smoothing, forcing, and withdrawal modes (56:44). The results obtained from this thesis supporting the same findings with respect to the rank-order importance, but with a notable difference. For every resolution mode, SPO managers consistently reported a lower degree of acceptance and usage.

THE MOST AND LEAST IMPORTANT MODES OF CONFLICT RESOLUTION

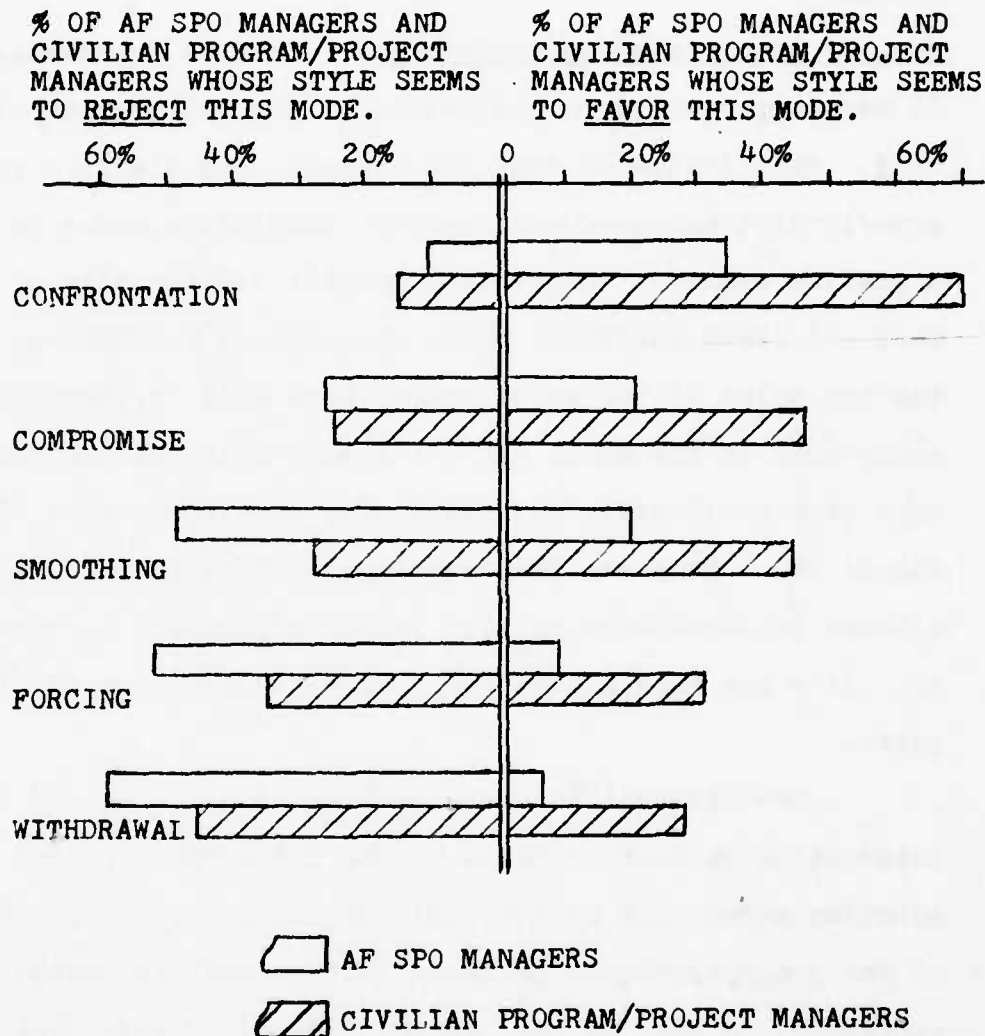


Figure 14. Comparison of Air Force and Civilian Usage of Conflict Resolution Modes.

This may well be due to the more procedurized military nature of the SPO environment. The larger size and the more formal organization of many SPOs would logically lead to a more pronounced bureaucratic tending, which in turn may lead to clearly defined jobs; better understood authority relationships; clearer lines of communications; and more formal procedures for handling contingency problems in terms of proliferating directives, rules, and regulations. All of these factors may lead to the lower levels of conflict noted in the Research Hypothesis I results. This may also lead to a lesser dependence by the SPO manager on the various resolution modes since a lesser degree of conflict intensities apparently exists. However, this lesser dependence on one's own style of conflict resolution may cause other problems, such as smothering creative solutions and relying on formal procedures for decision-making. Better, more effective solutions may be bypassed as a result.

PART IV. FURTHER ANALYSIS OF DATA

To further analyze the collected data, additional testing was performed. Examination of the sample means of the relative intensities for each source of conflict by interfacing groups showed that the results derived from the Air Force sample were consistently smaller than the corresponding means from the Thamhain and Wilemon study (See Table 14). To support this graphical difference between means, a null/alternate hypothesis test was

Table 14

Tests of Significance of the Mean Relative Intensities of Each of Seven Sources of Conflict

SOURCES OF CONFLICT	INTERFACING GROUPS									
	SUBORDINATES		ASSIGNED		FUNCTIONAL		SUPERIOR		MEMBERS	
	TH ¹ MEAN	AF MEAN (STDEV) ²	TH	AF	TH	AF	TH	AF	TH	AF
PRIORITIES	.9	.287 (.515)	1.7	.706 (.679)	2.4	1.006 (.739)	1.0	.507 (.655)	1.2	.721 (.605)
ADMINISTRATIVE	1.0	.309 (.524)	1.3	.532 (.708)	1.4	.912 (.765)	1.1	.529 (.666)	.9	.584 (.652)
TECHNICAL	1.1	.353 (.495)	1.4	.699 (.60)	1.7	.779 (.592)	1.0	.478 (.596)	1.3	.566 (.54)
MANPOWER	.9	.228 (.471)	1.5	.537 (.729)	2.1	1.140 (.96)	1.1	.544 (.708)	1.0	.632 (.748)
COST	.6	.162 (.389)	1.0	.360 (.540)	1.3	.610 (.701)	.8	.331 (.572)	.7	.412 (.602)
SCHEDULES	1.1	.257 (.439)	2.0	.515 (.620)	2.5	.801 (.806)	1.4	.412 (.590)	1.5	.551 (.676)
PERSONALITY	1.1	.199 (.418)	1.1	.419 (.629)	1.1	.419 (.552)	1.0	.287 (.631)	1.3	.412 (.551)

¹Thamhain and Wilemon means were taken from Figure 9, p. 79.²AF means (STDEV) or Air Force means and standard deviations were calculated from a sample of 136.

conducted for each of the corresponding means.

The test method used was described by Winer (64: 18-24, 641). Since the standard deviation was not known for the Thamhain and Wilemon sample means, their means were assumed to be the universe means. The Air Force standard deviation for the universe was estimated from the Air Force sample. The test was conducted at the .05 significance level using the Student t distribution. The statement of proposition for the tests were as follows:

The relative intensity for each source of conflict by interfacing groups, derived from the military, is significantly lower than the corresponding relative intensity derived from the Thamhain and Wilemon study.

For each of the corresponding means, the following null/alternate hypotheses were tested:

Null Hypothesis, H_0 : AF mean=Universe mean
(Thamhain and Wilemon mean)

Alternate Hypothesis, H_1 : AF mean<Universe mean

The result of each test rejected the null hypothesis at even the .01 significance level. The proposition was supported, indicating that there is a significant difference between SPO managers and civilian program/project managers relative to the mean relative intensities of each source of conflict by interfacing groups.

Results of the Additional Testing. The relative intensities of conflict for the SPO manager was lower in every case than for the civilian program/project manager. This

supports the findings that the environmental differences discussed in the Research Hypothesis I section may cause the significant differences in the relative intensities of conflict faced by the military SPO managers and civilian program/project managers.

Other Notable Descriptive Statistics. Other descriptive statistics that were not directly related to the hypothesis testing used to support this thesis effort are presented in Appendices B and C.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER RESEARCH

Summary of Results

The causes and intensities of conflict in Air Force SPOs during the various phases of the program life-cycle were studied using basically the same variables used in the civilian research, which included sources of conflict, interfacing groups, and modes of conflict resolution. The results were compared to those of Thamhain and Wilemon's studies of civilian program/project management efforts. The overall findings of this effort are presented below:

1. As perceived by SPO managers, the intensities of the conflict sources changed across the program life-cycle as the program requirement evolved.
2. The SPO managers tended to aggregate the interfacing groups into three classes based on his perception of the intensities of conflict generated by his relationship of each class. The SPO manager viewed interfacing groups of subordinates, assigned personnel, and other SPO members as a class of people internal to his program organization and upon whom he could exercise direct supervision. Superiors, functional departments and other SPO members were viewed as a class of people external to the SPO manager's direct control, but still within the

parent organization of ASD. The class of people in outside agencies tended to be viewed as an entity by themselves. Each of these classes were viewed as creating different intensities of conflict for the SPO manager.

3. The comparison of the Air Force results with the results obtained by Thamhain and Wilemon showed that though conflict intensities of both studies changed over the program life-cycle, the data did not demonstrate similarities in what was changing and in which direction. Further, the SPO managers perceived lesser overall conflict intensities than the civilian managers. Differences in the changes across the life-cycle between the SPO and civilian studies were attributed primarily to organizational and environmental differences.

4. The SPO and civilian managers rank-ordered the appropriateness of the different modes of conflict resolution identically. However, when the data was graphically analyzed, the SPO manager rated the actual use of each mode to a lesser degree than did the civilian managers. This may be due to the formalized program structure of the Air Force organizations and the fact that SPO managers perceived less overall conflict.

Conflicts within the SPO Environment

The data collected and the analysis accomplished in this thesis indicated that there are significant differences in the perceptions of the respondents regarding the conflict intensities that exist across the life-cycle

phases of the weapons system acquisition process. This supports the findings of previous studies that noted changes in behavior patterns of SPO managers in the different program categories (16, 32, 37, 49). Knowledge of when to expect the highest intensities of conflict in a program life-cycle may enable managers to better meet the managerial challenges encountered during each successive phase.

Comparison of Conflicts within the AF SPO and Civilian Program/Project Environments

Notable Differences in Conflict Intensities. The military SPO managers and civilian program/project managers accomplish basically similar jobs but in different environments, with different experiences, and under dissimilar incentives. In civilian industry, programs/projects are provided a greater opportunity to maintain personnel tenure and to minimize excessive personnel turnovers so that the people can contribute more to the jobs in which they have acquired an expertise. In contrast, the short tenure and high turnover of SPO managers leads to more management dependence upon the directives, rules, and formal procedures typical of large bureaucratic organizations. The more formalized SPO organizations and the greater dependence upon formal procedures are probably the foremost reasons for the consistent lower degrees of conflict intensities that were found in the SPO environment. As a result, the dysfunctional aspects of conflict may be stifled. At the

same time, however, the beneficial, creative aspects of conflict that are so necessary to the effective accomplishments of program efforts may also be reduced or missing from the Air Force SP0.

A primary difference between the civilian and SP0 manager is the existence of the extensive influence of the outside agencies interfacing group in the Air Force environment. The layers of management and numerous interfacing but non-program related agencies place a huge burden upon the SP0 manager's limited time. The energy and time devoted to satisfying the requests of outside agencies subtracts from the time available to actually run the program. Contrasting to this, the civilian program/project manager spends the largest amount of his time on such activities as keeping the team on the same course and maintaining constant, total communications with the program/project participants and functional departments. He spends less time responding to the directives of other, marginally involved agencies and higher levels of authority. The civilian manager spends the majority of his time actively managing the program/project, team members, and the communications/coordination processes within the project. This active interaction will naturally cause higher levels of conflict intensity, as was illustrated in Figure 9. Additionally, the civilian manager has a great deal more at stake in successfully fulfilling the program/project goals. In the event of failure, it could very well mean

unemployment for him and his team members. Conflict would tend to be higher in such a work environment, as each team member is likely to feel very strongly about each conflicting point.

Optimal Use of Conflict Resolution Modes. The results of Research Hypothesis II indicated that SPO managers and civilian program/project managers used conflict resolution modes in a similar manner. The most notable difference was that the SPO managers tended to place a lesser reliance on the use of the resolution modes overall, which was probably due to the lesser intensities of conflict that existed within the SPO environment. As concluded by Thamhain and Wilemon in their study, the findings of this thesis also suggested that it is less important for the SPO manager to optimize a best mode of conflict resolution, than to be able to employ the full range of modes to deal with specific situations.

Application of the Program/Project Management Principles. The basic, generally accepted principles associated with the program/project management concept seem to apply to both the civilian and military program environments. The major differences which arise between the civilian and military organizations stem principally from the lesser degree of emphasis of principles within the military environment. The fact that this research effort showed such a significant difference in conflict intensities between

the military and civilian world doesn't negate the military applicability of previous civilian literature and research findings relating to program/project management. What is important is to know and realize how the concept is applied in both the civilian and military environment.

Therefore, the differences of conflict intensities are interpreted to result from the different applications of project management theory to meet the different environmental demands. This is supported by the finding that some human behavior characteristics displayed by both SPO managers and civilian program/project managers remained essentially the same, as evidenced by their same basic usage of the conflict resolution modes (See Figure 14) and their same basic perceptions relating to conflict issues in program/project management as indicated in Appendix B.

Recommendations for Further Research

It is hoped that this research effort will stimulate others to further study areas relating to conflict in program management in the Air Force. In the interim, this study can provide SPO managers with evidence which can help identify where the greatest conflict is likely to exist in their own organizations. They should actively take such actions as are in their power to create conditions likely to be conducive to "manage" the conflict environment of their program.

It is recommended that further research be conducted in the following areas:

1. To further define and analyze the effects of environmental differences, a similar investigation could be made to measure the conflict variables of this study with Air Force Logistics Command program managers for a comparison with Air Force Systems Command program managers to discover possible differences in the types of conflict they face.

2. Verification of this study's results could be accomplished by an investigation to measure and compare conflict variables of this study with the program managers of AFSC's other two product divisions of ESD and SAMSO.

3. A study into the military program management structure as it exists today and how it could be improved to reduce the dysfunctional aspects of management layering. This could include the study of previous successful efforts such as the "Blue Line" direct reporting lines described by Fox which bypass the numerous management layers to allow the program managers to report "to the top".

Concluding Remarks

In closing, the implications of this research effort can best be summed up through this direct quote from one of the participating survey respondents:

The program manager's prime task is that of resolving conflict. Internal to his program he receives multi-discipline inputs with respect to the directed task, makes tradeoffs as required to align program goals with the weapon system's program goals, and provides a definitized program plan with specific objectives. This establishes the course of action for those working on the program; all external or internal changes must come through the program manager only. External to the program itself, the program manager is the program interface with the rest of the weapons system and the using and supporting commands. His primary task here is resolving conflicts with respect to priorities. The manager must be most knowledgeable of not only his program, but its impact to other agencies. The depth of knowledge in most cases must match or exceed that of the agency involved. Thus armed, he can then assist the effected agency in discovering that the program's goals are aligned with that agency's goals and priorities. This methodology produces cooperation and support that far exceed the response from an authoritarian directive.

In summary, the program manager sets specific program objectives that compliment weapons system and user priorities. He then protects his program from external perturbations by validating the contribution of program priorities to external agencies' goals.

APPENDICES

APPENDIX A
SPO DATA COLLECTION INSTRUMENT

DEPARTMENT OF THE AIR FORCE
AIR FORCE INSTITUTE OF TECHNOLOGY (AI)
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433



REPLY TO
ATTN OF: LSG (LSSR 3-77B/Captains Eschmann and Lee/AUTOVON 78-74240)


SUBJECT: Conflict in Program Management Questionnaire

TO:

1. The attached questionnaire was prepared by a research team at the Air Force Institute of Technology, Wright-Patterson AFB, Ohio. The purpose of the questionnaire is to gather sufficient data to examine the causes and intensity of conflict in Air Force System Program Offices during the various phases of the program life-cycle, and compare these findings with a research effort that investigated conflict in civilian program management organizations.

2. You are requested to provide an answer or comment for each question. Headquarters USAF Survey Control Number 77-90 has been assigned to this questionnaire. Your participation in this research is voluntary.

3. Your responses to the questions will be held confidential. Please remove this cover sheet before returning the completed questionnaire. Your cooperation in providing this data will be appreciated and will be very beneficial in evaluating a comparison between Air Force and civilian program management organizations. Please return the completed questionnaire in the attached envelope within one week after receipt.


HENRY W. PARLETT, Colonel, USAF
Associate Dean for Graduate
Education
School of Systems and Logistics

2 Atch
1. Questionnaire
2. Return Envelope

CONFLICT IN PROGRAM MANAGEMENT
QUESTIONNAIRE

USAF SCN 77-90 (Expires 30 September 1977)

PRIVACY STATEMENT

In accordance with paragraph 30, AFR 12-35, the following information is provided as required by the Privacy Act of 1974:

a. Authority:

- (1) 5 U.S.C. 301, Departmental Regulations, and/or
- (2) 10 U.S.C. 8012, Secretary of the Air Force, Powers, Duties, Delegation by Compensation, and/or
- (3) DOD Instruction 1100.13, 17 Apr 68, Surveys of Department of Defense Personnel; and/or
- (4) AFR 30-23, 22 Sep 76, Air Force Personnel Survey Program.

b. Principal purposes. The survey is being conducted to collect information to be used in research aimed at illuminating and providing inputs to the solution of problems of interest to the Air Force and/or DOD.

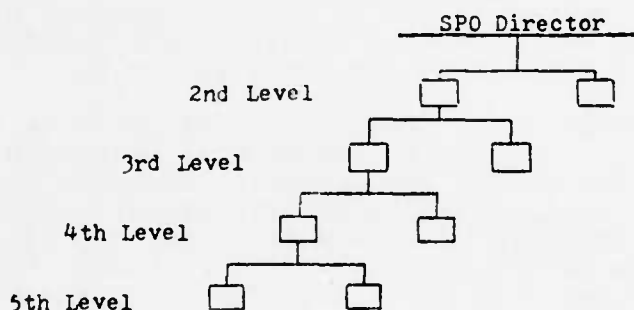
c. Routine Uses. The survey data will be converted to information for use in research of management related problems. Results of the research, based on the data provided, will be included in written master's theses and may also be included in published articles, reports, or texts. Distribution of the results of the research, based on the survey data, whether in written form or presented orally, will be unlimited.

d. Participation in this survey is entirely voluntary.

e. No adverse action of any kind may be taken against any individual who elects not to participate in any or all of this survey.

CONFLICT IN PROGRAM MANAGEMENT
QUESTIONNAIRE

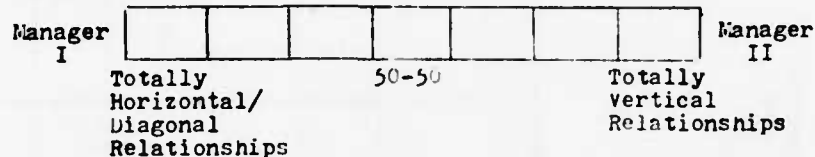
1. Name of Program: _____ Age of Program: _____ mo.
2. Military Rank or Civilian Grade: _____
3. Age: _____ years
4. Program Management Experience: _____ yr. _____ mo.
5. How many system programs have you worked with? _____
6. Education (circle one): HS AA BS MBA MS DBA Phd
7. Organizational Level. Place a checkmark in the box that best corresponds to the level of your duty assignment.



8. Consider the following two statements. After reading them, place a checkmark in the box that best indicates the extent to which your primary duties are described by one of the definitions or a combination of the definitions.

Manager I is a manager involved in dealing with other agencies outside of his formal authority (chain of command). He relies a great deal on horizontal/diagonal relationships in an effort to monitor and control the cost, schedule, and performance parameters of a program/project. Horizontal/diagonal relationships refers to cutting across lines of authority on the organizational chart.

Manager II is defined as a manager involved in managing his on-going activities in a well-defined functional area relying primarily on strict vertical chain of command relationships.



9. What percentage of your program tasks are accomplished...
- a. by yourself or subordinates directly assigned to your section %
 - b. by program personnel assigned to your SPO from other functional groups %
 - c. by other functional support departments over which you may have little or no control %
- 100%
10. From your own experience, would you agree or disagree with the following statements? Write a number in the blank for each statement, based on this scale:
- (1) Strongly disagree
 - (2) Disagree
 - (3) Neutral or mixed feelings
 - (4) Agree
 - (5) Strongly agree
- a. The greater the diversity of expertise among the participants of a program, the greater the potential for conflict.
 - b. The lower the program manager's power of reward and punishment, the greater the potential for conflict to develop.
 - c. The less the specific objectives of a program are understood by the members, the more likely that conflict will develop.
 - d. The greater the ambiguity of roles among program participants, the more likely conflict will develop.
 - e. The greater the agreement on top management goals, the lower the potential for detrimental conflict on the program level.
 - f. The lower the program manager's formal authority over supporting organizational units, the more likely conflict will occur.

11. What are the major causes of conflict in your work environment? Indicate the relative magnitude by a checkmark in the columns provided. Definitions of the terms used are provided on the following pages. The numbers in each column represent the intensity of conflict as follows:

- (1) No conflict
(2) Some conflict
(3) Considerable conflict
(4) Great conflict

	With Your Subordinates	With Assigned Program Personnel	With Functional Departments	With Your Superior	With Other SPC Members	With Outside Agencies
Conflict over Program Priorities	(1) (2) (3) (4)	(1) (2) (3) (4)	(1) (2) (3) (4)	(1) (2) (3) (4)	(1) (2) (3) (4)	(1) (2) (3) (4)
Conflict over Administrative Procedures
Conflict over Technical Opinions and Performance Tradeoffs
Conflict over Manpower Resources
Conflict over Cost Objectives
Conflict over Schedules
Personality Conflict

Definitions for Question #11

(A) VERTICAL AXIS - 7 POTENTIAL CONFLICT SOURCES

CONFLICT OVER PROGRAM PRIORITIES. The views of program participants often differ over the sequence of activities and tasks which should be undertaken to achieve successful program completion. Conflict over priorities may occur not only between the SPO and other support groups, but also within the SPO itself.

CONFLICT OVER ADMINISTRATIVE PROCEDURES. A number of managerial and administrative-oriented conflicts may develop over how the program will be managed; i.e., the definition of the program manager's reporting relationships, operational requirement, scope, definition of responsibilities, interface relationships, negotiated work agreements with other groups, and procedures for administrative support.

CONFLICT OVER TECHNICAL OPINIONS AND PERFORMANCE TRADEOFFS. Disagreements may arise over technical issues, performance specifications, technical tradeoffs, and the means to achieve technical performance.

CONFLICT OVER MANPOWER RESOURCES. Conflicts may arise around the staffing of the program with personnel from other functional and staff support areas or from the desire to use another department's personnel for program support even though the personnel remain under the authority of their functional superiors.

CONFLICT OVER COST. Conflict may develop over cost estimates from support areas regarding various program work breakdown packages.

CONFLICT OVER SCHEDULES. Disagreements may develop around the timing, sequencing, and scheduling of project related tasks.

PERSONALITY CONFLICT. Disagreements may tend to center on interpersonal differences rather than on "technical issues". Conflicts are often "ego-centered".

(B) HORIZONTAL AXIS - 6 INTERFACING GROUPS WHERE CONFLICT MAY OCCUR

SUBORDINATES. Personnel that are directly assigned to the program and working under the supervision of the program manager.

ASSIGNED PROGRAM PERSONNEL. Personnel from the functional departments who are temporarily assigned to the program on a "loaned" basis.

FUNCTIONAL DEPARTMENTS. In an organization these are the specialized departments from which the program manager must obtain support for his program, i.e., the engineering office and the procurement office.

SUPERIORS. This refers to the personnel to whom the program manager is immediately responsible.

OTHER SPO MEMBERS. These personnel are the other team members assigned to a SPO. In a Super-SPO, this may refer to the various subsystem program managers who must work together to deliver a final product. In the smaller SPO's, this may refer to other program managers on the same organizational level upon which a program manager may have to depend on for his own program's objectives.

OUTSIDE AGENCIES. This includes outside influences such as AFSC Headquarters, user commands, Inspector General teams, and the host or outside Air Force agencies that continually interface with ASD program managers.

12. Indicate the current system acquisition phase for your Program. If aspects of your program cover several phases, indicate below the phase in which the majority of the tasks fall.

Conceptual ☐ Validation ☐ Full-Scale Development ☐

Production ☐ Deployment ☐

13. Relating to your own experience, where in time would you say most of the conflict occurs over the program life? Please indicate by checking the appropriate column for each conflict category (only one checkmark per row).

Conflict over...	Conceptual	Validation	Full-Scale Dev.	Production	Deployment	Equal in all Periods
Program Priorities						
Administrative Procedures						
Technical Issues						
Manpower Resources						
Cost Objectives						
Schedules						
Personality						

14. The list of 15 proverbs represents folk wisdom about methods of handling conflict. Use the following scores in evaluating the accuracy at which each proverb describes the actual way you resolve conflict.

- (1) Very accurate in most situations
- (2) Accurate in some situations
- (3) Accurate only in very few situations
- (4) Not accurate at all

	How Accurately Does the Proverb Describe the Way You Resolve Conflict Between You and...		
	...Your Program Personnel?	...Your Superior?	...Functional Sup-Depart.?
Better half a loaf than no bread			
Might overcomes right			
Come now and let us reason together			
The arguments of the stronger always have the most weight			
When two quarrel he who keeps silent first is the most praiseworthy			
If you cannot make a man think as you do, make him do as you think			
When one hits you with a stone, hit him with a piece of cotton			
By digging and digging, the truth is discovered			
Kill your enemies with kindness			
You scratch my back, I'll scratch yours			
He who runs away lives to run another day			
It is easier to refrain than to retreat from a quarrel			
Soft words win hard hearts			
Don't stir up a hornet's nest			
A man who will not flee will make his foe flee			

APPENDIX B

**PERCEPTIONS OF SPO MANAGERS TOWARDS
CONFLICT DETERMINANTS**

APPENDIX B

PERCEPTIONS OF SPO MANAGERS TOWARDS CONFLICT DETERMINANTS

Thamhain and Wilemon empirically tested seven propositions as listed below on specific determinants of project management conflict (57:40).

Proposition 1: The less the specific objectives of a project are understood by project team members the more likely that conflict will develop.

Proposition 2: The more members of a functional area perceive that the implementation of project management will adversely affect their traditional organizational roles, the greater the potential for conflict.

Proposition 3: The greater the ambiguity of roles among participants of a project team the more likely that conflict will develop.

Proposition 4: The greater the agreement on top management goals, the lower the potential for detrimental conflict at project level.

Proposition 5: The lower the project manager's formal authority over supporting organizational units, the more likely conflict will occur.

Proposition 6: The lower the project manager's power of reward and punishment, the greater the potential for conflict to develop.

Proposition 7: The greater the diversity of expertise among the participants of a project team, the greater the potential for conflict.

The results of the study were "specifically, project managers perceive that the intensity of conflict is likely to increase with (1) decreasing understanding among project managers, (2) improper understanding of project mission,

organization, and roles of team members, and (3) decreasing formal authority, reward and punishment power over supporting units [57:35]". Propositions 1 through 6 were supported and not 7.

To compare the Air Force SPO managers and civilian project managers, SPO managers were tested using six of the seven propositions. Proposition 2 was not used because program management is already considered as an established organization in the Air Force. The only change to the six propositions used was the changing of the word "project" to "program" to correspond with Air Force terminology.

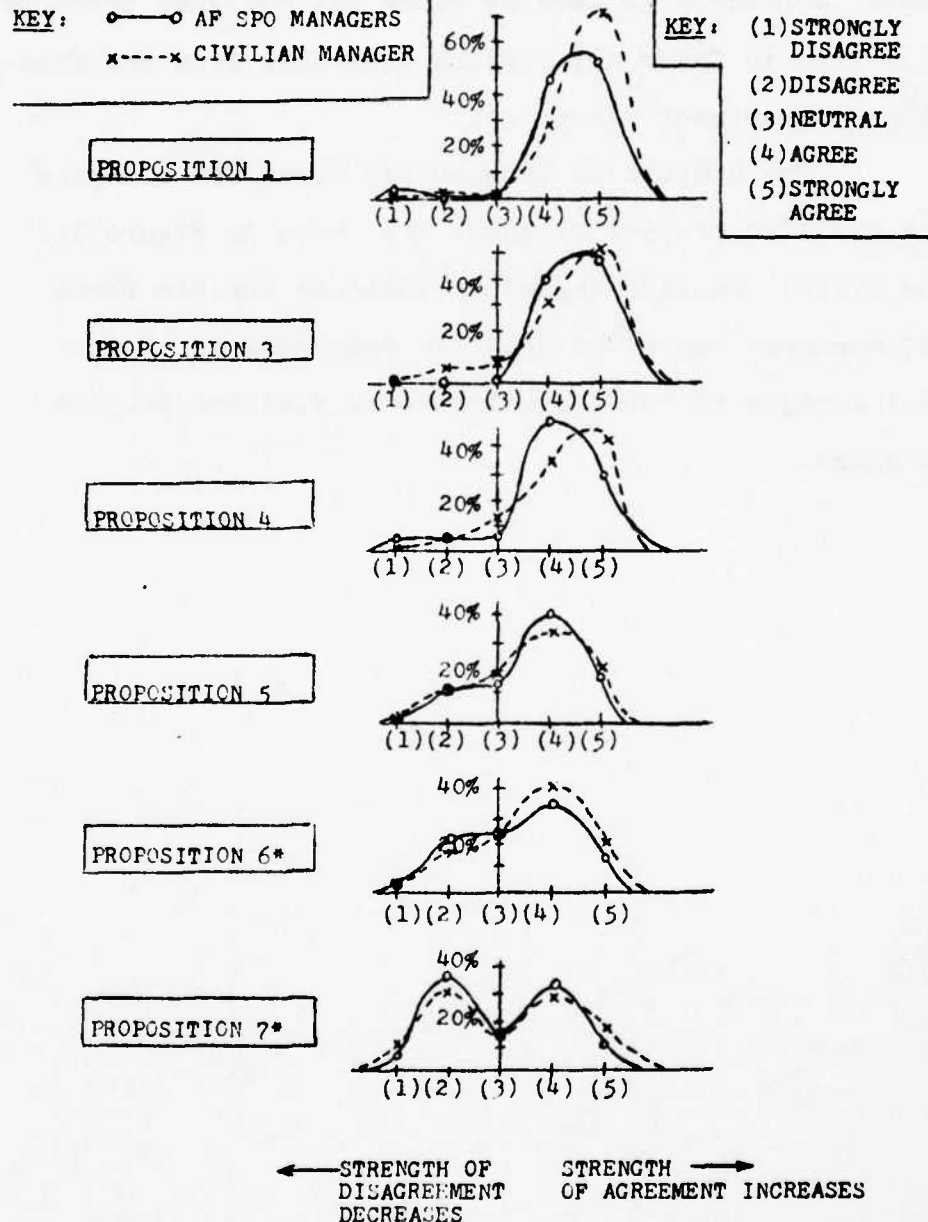
The research design and methodology, the same as that of Thamhain and Wilemon, consisted of the Kolmogorov-Smirnov (KS) and Binomial Test at the .01 significance level (57:35-36). The Air Force data was obtained from the survey instrument, question 10 (See Appendix A).

The results of the tests were the same as that of Thamhain and Wilemon except for Proposition 6, which was not supported. This may be due to the fact that since the matrix in Air Force Program Management Organization is specifically set up to provide support to the SPO managers, their performance reports depend highly upon their effectiveness in supporting a program, regardless whether the SPO manager writes the actual report or not. In civilian programs/projects, the situation may be different whereby the program/project manager may not be able

to influence any performance reporting of the functional support personnel temporarily assigned to him. This may cause conflicts to develop since the assigned personnel will tend to favor all actions desirable from the functional department viewpoints.

The comparison between Air Force SPO managers and civilian project managers are shown in Figure 15. The overall results tended to indicate the Air Force SPO managers perceived specific determinants of project management conflict similar to civilian project managers.

Figure 15. Distribution of Opinions Concerning Conflict in Program Management



*KS test resulted in rejection of the null hypothesis, but the Pinomical test could not reject.

APPENDIX C

OTHER DESCRIPTIVE STATISTICS

APPENDIX C

OTHER DESCRIPTIVE STATISTICS

Descriptive statistics were extracted from the data and are presented in the tables of this Appendix. A description of them follows. See Appendix A for the referenced questions.

Table 15 provided the number of respondents by their System Program Office in ASD. The data was tabulated from question 1 in the questionnaire.

Table 16 provided the number of respondents by military rank/civil service grade. The data was tabulated from question 2 in the questionnaire.

Table 17 provided the number of respondents by their position in the organization, i.e., organizational level. The data was tabulated from question 7 in the questionnaire.

Table 18 provided the number of respondents by education over the program life-cycle. The data was tabulated from question 6 in the questionnaire.

Table 19 provided the number of respondents by program life-cycle. The data was tabulated from question 4 in the questionnaire.

Table 20 provided the number of respondents by percentage of work performed by three groups: (1) SPO

manager and his subordinates, (2) assigned (collocated) functional personnel and (3) other functional departments. The data was tabulated from question 9 of the questionnaire.

Table 15

Number of Respondents by System Program Office

CODE FOR RAW DATA	SYSTEM PROGRAM OFFICE	FREQUENCY	RELATIVE FREQUENCY
113	F-16 SPO	4	2.9
114	A-10 SPO	6	4.4
115	B-1 SPO	6	4.4
122	F-15 SPO	5	3.7
201	INTERNATIONAL FIGHTER (F-5E/F)	18	13.2
202	EF-111A TACTICAL JAM- MING	4	2.9
203	SIMULATORS	7	5.1
204	AIRLIFT SYSTEMS	9	6.6
205	AGM-65 MAVERICK	4	2.9
206	FIGHTER ATTACK	12	8.8
207	ADVANCED MEDIUM STRATE- GIC TRANSPORT (AMST)	3	2.2
208	PRECISION LOCATION STRIKE SYSTEMS	6	4.4
209	ADVANCED STRATEGIC AIR LAUNCHED MISSILE	3	2.2
210	REMOTELY PILOTED VEHI- CLES (RPV)	13	9.6
212	AGM-69 SRAM	4	2.9
223	DEVELOPMENTAL PLANS	6	4.4
316	RECCE/STRIKE	14	10.3
317	AVIONICS STANDARDIZA- TION & SYSTEMS AR- CHITECTURE	4	2.9
319	ELECTRONIC WARFARE	4	2.9
321	SUPPORT EQUIPMENT	4	2.9
	TOTAL	136	100.0

Table 16

Number of Respondents by Rank/Grade

MILITARY RANK/CIVIL SERVICE GRADE	FREQUENCY	RELATIVE FREQUENCY %
LIEUTENANT	1	.7%
GS-9	3	2.2
CAPTAIN	41	30.1
GS-12 OR ABOVE	30	22.1
MAJOR	46	33.8
LIEUTENANT COLONEL	14	10.3
NO ANSWER	1	.7
TOTAL	136	100.0%

Table 17

Number of Respondents by Their Position in the Organization, i.e., Organizational Level

ORGANIZATIONAL LEVEL	FREQUENCY	RELATIVE FREQUENCY
1 (SPO DIRECTOR)	2	1.5%
2	26	19.1
3	76	55.9
4	28	20.6
5	4	2.9
TOTAL	136	100.0%

Table 18

Number of Respondents by Education Over the Program Life-Cycle

CATEGORY*	EDUCATIONAL LEVEL	FREQUENCY	RELATIVE FREQUENCY %
I	BS	10	33.3%
	MBA	3	10.0
	MS	15	50.0
	DBA	1	3.3
	PHD	1	3.3
	SUBTOTAL	30	100.0
II	HS	1	2.4
	BS	6	4.3
	MBA	12	28.6
	MS	19	45.2
	PHD	3	7.1
	OTHER	1	2.4
	SUBTOTAL	42	100.0
III	HS	1	3.1
	BS	7	21.9
	MBA	2	6.3
	MS	21	65.6
	PHD	1	3.1
	SUBTOTAL	32	100.0
IV	HS	1	3.1
	BS	8	25.0
	MBA	6	18.8
	MS	15	46.9
	NO ANS	2	6.3
	SUBTOTAL	32	100.0
	TOTAL	136	400%

*Categories refer to program life-cycle phases/stages, described on page 44.

Table 19

Number of Respondents by Program Experience
and Program Life-Cycle Category

CATEGORY *	PROGRAM EXPERIENCE	FREQUENCY	RELATIVE FREQUENCY
I	0 < MONTHS ≤ 18	6	20%
	18 < MONTHS ≤ 48	21	36.7
	48 < MONTHS	13	43.3
	SUBTOTAL	30	100%
II	0 < MONTHS ≤ 18	7	16.7
	18 < MONTHS ≤ 48	20	47.5
	48 < MONTHS	15	35.8
	SUBTOTAL	42	100%
III	0 < MONTHS ≤ 18	4	12.5
	18 < MONTHS ≤ 48	20	31.3
	48 < MONTHS	18	56.2
	SUBTOTAL	32	100%
IV	0 < MONTHS ≤ 18	6	18.7
	18 < MONTHS ≤ 48	20	31.3
	48 < MONTHS	16	50.0
	SUBTOTAL	32	100%
	TOTAL	136	400%

*Categories refer to program life-cycle phases/stages described on page 44.

Table 20
Number of Respondents by Percentage of Work Performed by Three Groups

PERCENTAGE OF WORK	GROUPS					
	WORK PERFORMED BY SPO MANAGER & HIS SUBORDINATES		WORK PERFORMED BY ASSIGNED FUNCTIONAL PERSONNEL		WORK PERFORMED BY OTHER FUNCTIONAL DEPARTMENTS	
	FREQUENCY	RELATIVE FREQUENCY	FREQUENCY	RELATIVE FREQUENCY	FREQUENCY	RELATIVE FREQUENCY
0 < % ≤ 10	5	3.7%	23	16.9%	63	46.3%
10 < % ≤ 20	10	7.4	23	16.9	26	19.1
20 < % ≤ 30	11	8.1	28	20.6	11	8.1
30 < % ≤ 40	15	11.0	25	18.4	7	5.1
40 < % ≤ 50	32	23.5	20	14.7	10	7.4
50 < % ≤ 60	17	12.5	4	2.9	1	.7
60 < % ≤ 70	13	9.6	2	1.5	2	1.5
70 < % ≤ 80	18	13.2	2	1.5	3	2.2
80 and above	12	8.8	2	1.5	0	0.0
NC ANSWER	3	2.2	7	5.1	13	9.6
TOTAL	136	100%	136	100%	136	100%

APPENDIX D

RAW DATA AND COMPUTER PROGRAMS

APPENDIX D

RAW DATA AND COMPUTER PROGRAMS

PART I. RAW DATA

The raw data from each questionnaire was coded in a sequence of numbers represented by two lines. The questionnaires were grouped by life-cycle categories. The key for the coding is presented first on the following pages before the raw data.

KEY FOR RAW DATA

VARIABLE/LABEL	POSITION OF VARIABLE VALUE	QUESTION RE- FERRED TO IN QUESTIONNAIRE	CODE, VARIABLE VALUES= DESCRIPTION*
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LINE #1

Q1 PROGRAM NAME	1-3	1	SEE TABLE 15.
Q2 PROGRAM AGE	4-5	1	XX=AGE IN MONTHS.
Q3 RANK/GRADE	6	2	1=LIEUTENANT, 2=CAPTAIN, 3=MAJOR 4=LIEUTENANT COLONEL, 5=COLONEL 6=GS-7, 7=GS-9, 8=GS-11, 9=GS-12 AND ABOVE.
Q4 INDIVIDUAL'S AGE	7-8	3	XX=AGE IN YEARS.
Q5 EXPERIENCE	9	4	1=0<MONTHS≤6, 2=6<MONTHS≤12 3=12<MONTHS≤18, 4=18<MONTHS≤24 5=24<MONTHS≤30, 6=30<MONTHS≤36 7=3<YEARS≤4, 8=4<YEARS≤5, 9=5 YEARS.
Q6 NUMBER OF PROGRAM	10	5	1=1 PROGRAM, 2=2, 3=3...8=8 9=9 AND ABOVE.
Q7 EDUCATION	11	6	1=HS, 2=AA, 3=BS, 4=MBA, 5=MS 6=DBA, 7=PHD, 8=OTHER.
Q8 ORGANIZATIONAL LEVEL	12	7	1=SPO DIRECTOR, 2=2ND LEVEL 3=3RD LEVEL, 4=4TH LEVEL, 5=5TH LEVEL.

*UNLESS OTHERWISE SPECIFIED 0=MISSING VALUE

VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUES= DESCRIPTION
Q9 PROJECT VS FUNCTIONAL	13	8	1=TOTALLY HORIZONTAL- DIAGONAL RELATIONSHIPS 2= ↑ 3= ↓ 4=50-50 5= ↑ 6= ↓ 7=TOTALLY VERTICAL RELATION- SHIPS.
Q10 PERCENT TASK	14	9a	1=0<%≤10, 2=10<%≤20, 3=20<%≤30 4=30<%≤40, 5=40<%≤50, 6=50<%≤60 7=60<%≤70, 8=70<%≤80, 9=80 AND ABOVE.
Q11 ASSIGNED PERSONNEL	15	9b	SAME AS ABOVE.
Q12 FUNCTIONAL DEPART- MENTS	16	9c	" " "
Q13 DIVERSITY OF EXPERTISE	17	10a	1=STRONGLY DISAGREE, 2=DISAGREE 3=NEUTRAL, 4=AGREE, 5=STRONGLY AGREE.
Q14 LOWER PM POWER	18	10b	" " "
Q15 SPECIFIC OBJECTIVES	19	10c	" " "
Q16 ROLE AUTHORITY	20	10d	" " "
Q17 GOAL AGREEMENT	21	10e	" " "
Q18 FORMAL AUTHORITY	22	10f	" " "

VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUES- DESCRIPTION
Q19 DATA?	23	14	1=MODES OF RESOLUTION DATA USEABLE, 2=MODES OF RESOLUTION DATA NOT USEABLE.
FORCING			
Q20 PROGRAM PERSONNEL	24	14	0=NOT ACCURATE AT ALL.
Q21 SUPERIOR	25	14	1= ↑ 2= ↓
Q22 FUNCTIONAL	26	14	3=ACCURATE ONLY IN VERY FEW SITUATIONS 4= ↓
			5= ↓
			6=ACCURATE IN SOME SITUATIONS.
			7= ↑
			8= ↓
			9=VERY ACCURATE IN MOST SITUA- TIONS.
SMOOTHING			
Q23 PROGRAM PERSONNEL	27	14	SAME AS ABOVE.
Q24 SUPERIOR	28	14	" " "
Q25 FUNCTIONAL	29	14	" " "
CONFRONTATION			
Q26 PROGRAM PERSONNEL	30	14	" " "
Q27 SUPERIOR	31	14	" " "
Q28 FUNCTIONAL	32	14	" " "

VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUES= DESCRIPTION
WITHDRAWAL			
Q29 PROGRAM PERSONNEL	33	14	" " "
Q30 SUPERIOR	34	14	" " "
Q31 FUNCTIONAL	35	14	" " "
COMPROMISE			
Q32 PROGRAM PERSONNEL	36	14	" " "
Q33 SUPERIOR	37	14	" " "
Q34 FUNCTIONAL	38	14	" " "
Q35 PRIORITIES	39	13	1=CONCEPTUAL, 2=VALIDATION
Q36 ADMINISTRATIVE	40	13	3=FULL SCALE DEVELOPMENT
Q37 TECHNICAL	41	13	4=PRODUCTION, 5=DEPLOYMENT
Q38 MANPOWER	42	13	6=ALMOST EQUAL IN ALL PERIODS.
Q39 COST	43	13	SAME AS ABOVE.
Q40 SCHEDULE	44	13	" " "
Q41 PERSONALITY	45	13	" " "
LINE #2			
Q42 PHASE?	1	12	1=CONCEPTUAL=VALIDATION
			2=FULL SCALE DEVELOPMENT
			3=PRODUCTION, 4=DEPLOYMENT.

VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUES= DESCRIPTION
Q43 DATA?	2	11	1=CONFLICT DATA USEABLE 2=CONFLICT DATA NOT USEABLE.
PRIORITIES			
Q44 SUBORDINATES	3	11	0=NO CONFLICT, 1=SOME CONFLICT 2=CONSIDERABLE CONFLICT 3=GREAT CONFLICT.
Q45 ASSIGNED	4	11	
Q46 FUNCTIONAL	5	11	SAME AS ABOVE.
Q47 SUPERIOR	6	11	" " " "
Q48 OTHER SPO	7	11	" " " "
Q49 OUTSIDE AGENCIES	8	11	" " " "
ADMINISTRATIVE			
Q50 SUBORDINATES	9	11	" " " "
Q51 ASSIGNED	10	11	" " " "
Q52 FUNCTIONAL	11	11	" " " "
Q53 SUPERIOR	12	11	" " " "
Q54 OTHER SPO	13	11	" " " "
Q55 OUTSIDE AGENCIES	14	11	" " " "
TECHNICAL			
Q56 SUBORDINATES	15	11	" " " "
Q57 ASSIGNED	16	11	" " " "

VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUES- DESCRIPTION
Q58 FUNCTIONAL	17	11	" "
Q59 SUPERIOR	18	11	" "
Q60 OTHER SPO	19	11	" "
Q61 OUTSIDE AGENCIES	20	11	" "
MANPOWER			
Q62 SUBORDINATES	21	11	" "
Q63 ASSIGNED	22	11	" "
Q64 FUNCTIONAL	23	11	" "
Q65 SUPERIOR	24	11	" "
Q66 OTHER SPO	25	11	" "
Q67 OUTSIDE AGENCIES	26	11	" "
COST			
Q68 SUBORDINATES	27	11	" "
Q69 ASSIGNED	28	11	" "
Q70 FUNCTIONAL	29	11	" "
Q71 SUPERIOR	30	11	" "
Q72 OTHER SPO	31	11	" "
Q73 OUTSIDE AGENCIES	32	11	" "

VARIABLE/LABEL	VARIABLE VALUE	QUESTION IN QUESTIONNAIRE	CODE: VARIABLE VALUE= DESCRIPTION
SCHEDULES			
Q74 SUBORDINATES	33	11	" "
Q75 ASSIGNED	34	11	" "
Q76 FUNCTIONAL	35	11	" "
Q77 SUPERIOR	36	11	" "
Q78 OTHER SPO	37	11	" "
Q79 OUTSIDE AGENCIES	38	11	" "
PERSONALITY			
Q80 SUBORDINATES	39	11	" "
Q81 ASSIGNED	40	11	" "
Q82 FUNCTIONAL	41	11	" "
Q83 SUPERIOR	42	11	" "
Q84 OTHER SPO	43	11	" "
Q85 OUTSIDE AGENCIES	44	11	" "

RAW DATA: CATEGORY I

0010 316129509943461344555413228589557773482316223
0011 11012101101111112102001112001201112113110100
0020 204174397253144234455414444448884443331623346
0022 11122111122121111121111110112111111112111
0030 208482344235482123454113653246542317752522225
0033 1111011001111011111213212112113122113000100
0040 207003364133272122434314542226661113336633336
0044 111121121111121122121121120011021122121111
0050 207602352153454123444414445557773336660000000
0055 1111101101101000100100000001100100000000000
0060 209342325033351425554410114346551234351206336
0066 1100010200010100000100000100000000100000000
0070 203002303253262232554211213336665554444234123
0077 11000001111112110002233232000001000001111011
0080 319122282533464142554413334436661114341223336
0088 11111001110000112110120010000000111001000000
0090 203073363353272134444311012222220002020000000
0099 11011000001010011112012000000000011011000000
0100 210212364153391125444510100321213330226623666
0101 11000000000111111210000000111201100000000000
0110 316453359153255022553212227777774446661611166
0111 110000001110000000000000000000000000000000
0120 212243009233281124545510007774443336666666666
0122 11003111112111000101003000100111112011000000
0130 223069406132344433444416669997777786661111111
0133 11111211111110111111122111111111111211111110
0140 223299579632460444544416668887777776662606446
0144 1111111111101011201011211000000000000000000
0150 209004437751453324444315558889993335456666666
0155 1111111200000111111101102101101111001001000
0160 223009417073291124555412326569694551332611246
0166 11012111112110001010013110012211113212001010
0170 204309579532144251345514548786664544451334231
0177 1101200100100111101100110000000000000000000
0180 316729489732291122454211226558873330103633336
0188 1100111100000011111011110011101001000000000
0190 209349419644123521545210112326671112253316362
0199 11002113000103002013002001001022002021000001
0200 223099429553371225553214444443332204431322341
0201 11011211000111111001012222000000122033000011
0210 316564419952372132454516342222222225583423236
0211 1101111211211001111201110000111111211111111
0220 223004415252281243145417382432853786666616446
0222 11112112012111011112112120111111011122001000
0230 223962340052455143444311328777665556660000000
0233 11010111000000000001000001000000000001000000
0240 210602309553681223444413884447664658563323336
0244 11003111001100030100013010000000001000030200
0250 208483399943362222443212020004220000006666666
0255 11001001011111111111001011000001000001000002

0260 210603369562144223552211216566663335452636266
 0266 111111111111111121112123120000001012012111111
 0270 32103337235303621245422000000000000001622446
 0277 11000001010010000002001001000002000002010010
 0280 2084833831531541225553200000000000000000000
 0288 11122313122313001002232310012111121211111311
 0290 316482315233382124555520000000000000002226226
 0299 11000001001001000001001002000000000002000000
 0300 207653389253245123245313332226661113342332226
 0301 11001011000001111101000100000000000101000000

RAW DATA: CATEGORY II

0010 317122349353481134555420000000000000002633666
 0011 21111111122211000000012311000202111111001111
 0020 21072929952319003354542000000000000000000000
 0022 21001000000000001000001000001000001000010000
 0030 2102433442732533445544200000000000000003323336
 0033 21002011001010011011001100001001001001002000
 0040 3163533975822532454444200000000000000003426346
 0044 2111101101101101101111111112011011011110010
 0050 210362316353291124545420000000000000003623336
 0055 21012011011011011011002021001011002011001000
 0060 317123363143273122445315659887774348686603006
 0066 21012002021020001001012011001111022112001001
 0070 204009629933355023444313436667776668780000000
 0077 21011111000110111111000000001110011211000200
 0080 203347256134321734454512000003112001003633336
 0088 21011011010101011001010101010001010101010001
 0090 203502344144227242244412226668883335451236126
 0099 210020000010110010000131000000000001000001011
 0100 203339439943333545554511422135440224456333236
 0101 21112111113101112112112210102102112112112111
 0110 203332314453212721555213236365351112236614346
 0111 21012210011100011000022210011100022111000000
 0120 204999539133682124451414237985555533254634436
 0122 21001011011011010111010000011011111111000000
 0130 210704409332263245554513346657684444463036136
 0133 2101212211212111211123122012012112112001011
 0140 210724409343254133555412226669996663332626226
 0144 2111101111111111111101111100111100000111112
 0150 210002347353582143555510004447772224342333366
 0155 21001011001011111001001011000000001011000000
 0160 210722344243455024555213331113330002243323433
 0166 2100110100000002000000200000000000000000000
 0170 319243384343321845555411932125351216463223446
 0177 21012110001210001001013112011102002103011200
 0180 316363419543253223554416682014340100046333346
 0188 21011011012001011012013011002001103002000000
 0190 316483367253291113444310123338883332113333336
 0199 21000001000001001001012011000001000001000000
 0200 317123373132255144554414443336663336663326336

0201 21111111000000111011000001111111111111000000
 0210 317262334253244245445513733336464345453623336
 0211 2110100200000010000000100000000001103000003
 0220 20313342995320904455441888442878445555333223
 0222 211112111122111111211111200000000000000000
 0230 208482314644672115555512228887785555572323236
 0233 21121121222121222221111111222221111111111111
 0240 208482323144383044554413666568544565652323332
 0244 2111111300111111113011112111112111112111112
 0250 208601244144281135554414441115552224543333336
 0255 21012123012120011111000000001000000000011110
 0260 113423378274291121544410750360780100222332336
 0266 21011111000200000102000000000001000002000000
 0270 11360227865424433544451635757835576775232336
 0277 21011112011110011212000000001111001011001111
 0280 11723341153264124553312032124470002133623366
 0288 21011012000011011112011112011112011112000000
 0290 202523387133355123554410113335161423442233343
 0299 21111310211101111221122300000210000122000310
 0300 202482303153362232542412323316650004436636666
 0301 21011012000000010011001011000001011002011011
 0310 202283389952241545555517970006564447772222336
 0311 2100000101100111112111112000003000202011012
 0320 206002355254244444454516684557775675673626336
 0322 21012023023123001012003123012112022123001011
 0330 206393382154645142544413123227641115462606666
 0333 21102012101011001111012010001012101111101011
 0340 205263359243155115551414446666663335556666666
 0344 21022113122012121103122113111003111003121001
 0350 205262323154354124544411110006471015023636366
 0355 21001003110011000002001000000002000002000001
 0360 205993364153155124544311310006560006663336666
 0366 21332122000000000001022022000000002100000000
 0370 205242337243173114555412210016520001012333233
 0377 2100111000111000000000201000000000000000000
 0380 113362355254255143554210330330880110446600030
 0388 21000001000010000000000000000000000000000000
 0390 319003386353251542452110000003130000003616056
 0399 21001012001011111111001001111011000000000000
 0400 202003389353273134555410412017650104432624446
 0401 211111000100000000000001000000100110100000000
 0410 316302354172244324443414444358792224353333333
 0411 21111111001211112221000100000000001100011200
 0420 316369409352363224554415557775555553331333446
 0422 21000100201100011110010000000100110110000000

RAW DATA: CATEGORY III

0010 115002329244228033444420000000000000003636346
 0011 311111111111111111111111111111101011101111110
 0020 122004409452135325435520000000000000005303040
 0022 3100202100222200000000213200000000002000010

0030 2012893499333631251115200000000000000006666666
0033 310020010121020121020021100000000002011002011
0040 2123044391532820224522200000000000000003623436
0044 31001010000000010000000000010000010000000000
0050 11584036904300554444431563322646333223323346
0055 31011011011011000000001000000000000011001011
0060 204002301033253224454413562335664762662613646
0066 312221122221211111112101212101101101111111
0070 122992324153134322545216555346662226775035456
0077 31002011110011112012002121002021112012001012
0080 316483335151391114555510013216661114423333333
0088 311221112221111101112210010001211011111000
0090 11583337925423251245421444000323111324132446
0099 31011010112110112111011110111000112111011110
0100 210312336253564143454416256645453136462631126
0101 31012112011010111122111011000001000000011011
0110 114484439252355122444210020004440000001333446
0111 3100000101100111101100100000000000000000000
0120 201007406013413823545415552224442228883431111
0122 31010011110211110111000000000000000000220000
0130 114002319254473124455511011114440003433433333
0133 31122112122120001011001010011012021122020010
0140 212242306153244243554410211125441114443636336
0144 31011013001101011111001001001002000003000001
0150 210369379233273133554313332125541023263416436
0155 3111111110211111010200100001001112101000000
0160 212992289253063155555511152038563225256666666
0166 31011023001011000013002013000002000003011010
0170 114843368134237122444415332344443434133460066
0177 3100000001111011010001001011111011111000000
0180 210003354254433653555311113337774446661326666
0188 31010102010100020101000011010101010101020000
0190 114003344154281222454412642118880000003433346
0199 31011013001011001011000002000011000012000001
0200 114243412253382132454312322224444445553323330
0201 31000000011101001111001000000001001011000000
0210 114003379253223545554514246467775655553334436
0211 31111012011021011113112121011012011012011011
0220 316784406252263222551411412226660224453333333
0222 3100110000200000000000011000000000000000000
0230 319993419755583134445513623453240100001626126
0233 31002001001101001111002010000000000100000000
0240 316999499933390125554314652225551115553623336
0244 31000001000001000000000002000000000000000000
0250 321367243133233543143413537775450325245231356
0255 310211120310120010030001000230000002002030031
0260 122963359353160435454515554447673335456633336
0266 31002011010011011001011011010011012011010011
0270 122993356153353323554414446668887779990636126
0277 31011001001000011001012100012002000000011100
0280 115993399255345144552417985553241113363600646
0288 31001200001210011210000100021230021220010310
0290 115003387154253324545410004447573336466663306

0299 31001011001010011011000000001011000011001000
 0300 115843379174120814455414442226661213433433356
 0301 31001012000000011012001001011011000000001010
 0310 204232363153236143555412532028671213343626226
 0311 31010001021011011012033233011011002030010010
 0320 12284236953237212244431666666666666666413416
 0322 3101101300000301111201111001111011111000000

RAW DATA: CATEGORY IV

0010 201849609803482154553512223337774442253322236
 0011 41000001000001000000001000000000000000000001
 0020 20608372254225322554213332225550004440000000
 0022 41011001000000000000000000000000000001001111000000
 0030 206992344343354133554516667778885469993413346
 0033 41011112012111011111001001000001000002000011
 0040 201009359333454123444413034446665553443221416
 0044 41000001000001011111011011011111011111011011
 0050 204999534335371224155310002227570002330513400
 0055 41000001000001000000000000000000000000000000
 0060 321609369232582122554410209785240114464444345
 0066 41121112121113111012112122000001011012000000
 0070 204999419553350444444412224445553336666666666
 0077 411111000111000011000000000111000111000111000
 0080 321999409142236142554413552016464415431310366
 0088 41003112001000111001003212001101112102000100
 0090 316603377143282023444410161144431274563114336
 0090 41002112002011000000011010000101000001000100
 0100 204992284453364132445311212125450004441116116
 0101 41000001001101000000000001000000000101000000
 0110 206584419953244244544515357777774444443633266
 0111 41011022111110110003022113102002111113011021
 0120 206009009734362244444513337776664444463424456
 0122 41001001001101000000001101000000000001000000
 0130 206999326034355115445314444448884446666612311
 0133 410000000000000000000000000000000000001000000
 0140 206349282353291142444410202225330000002626636
 0144 4100000100000001110100000100000000000000011
 0150 206003382143128124442312228888882224446420066
 0155 4100100100100100000000000000000001000000000000
 0160 206999599934254243444411216668886665456636666
 0166 41011001001001001001000000000000000000000000
 0170 206004456553273144445414442105553344532632233
 0177 41000001101011100011101000000000000000000000
 0180 206999484934346142442212227776654446670000000
 0188 41000000000000010000000000000000000000000000
 0190 201003429252490044453413334448884445553633336
 0199 41011011111111011111000110012012111112100001
 0200 201999539413200034544412237778683332221664146
 0201 41000011001011011111011011011011000000000000
 0210 201992304034362223454412455576650025381436666
 0211 41011011011121001010002100001001012012001011

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PART 2. COMPUTER PROGRAMS

TEST I

```
0010 S,R(SI) :,8,16;:,16
0020$:IDENT:WP1191, AFIT/SIG ESCHMANN AND LEE
0030$:SELECT:SPSS/SPSS
0040RUN NAME;KENDALL TAU STATISTICS
0050VARIABLE LIST;CON,FSD,PRO,DEP
0060INPUT FORMAT;FREEFIELD
0070INPUT MEDIUM;CARD
0080N OF CASES;7
0090NCNPAR CORR;CON,FSD,PRO,DEP
0100OPTIONS;1,5
0110STATISTICS;ALL
0120READ INPUT DATA
0200 .789 .845 .719 .656
0210 .672 .635 .703 .568
0215 .767 .694 .693 .448
0220 .800 .694 .578 .427
0225 .467 .508 .464 .339
0230 .711 .655 .547 .490
0235 .356 .377 .391 .333
9990GINISH
9995$:ENDJOB
```

TEST II

```
0010 S,R(SI) :,8,16;:,16
0020$:IDENTI:WP1191, AFIT/SIG ESCHMANN AND LEE
0030$:SELECT:SPSS/SPSS
0040RUN NAME;KENDALL TAU STATISTICS
0050VARIABLE LIST;G1 TO G6
0060INPUT FORMAT;FREEFIELD
0070INPUT MEDIUM;CARD
0080N OF CASES;7
0090CNONPAR CORR;G1 TO G6
0100OPTIONS;1,5
0110STATISTICS;ALL
0120READ INPUT DATA
0200 .287 .706 1.096 .507 .721 1.235
0210 .309 .632 .912 .529 .684 .794
0215 .353 .699 .779 .478 .566 1.037
0220 .228 .537 1.140 .544 .632 .684
0225 .162 .360 .610 .331 .412 .816
0230 .257 .515 .801 .412 .551 1.081
0235 .199 .419 .419 .287 .412 .456
9990CFINISH
9995$:ENDJOB
```

RESEARCH HYPOTHESIS I

```

0010 S,R(SL) : ,8,16; ,16
0020$:IDENT :WP1191, AFIT/SIG ESCHMANN AND LEE
0030$:SELECT:SPSS/SPSS
0040RUN NAME;KENDALL TAU STATISTICS
0050VARIABLE LIST;CON,FSD,PRO,DEP,WTCON,WTFSD,WTPRO,WTDEP
0060INPUT FORMAT;FREEFIELD
0070INPUT MEDIUM;CARD
0080N OF CASES;7
0090NONPAR CORR;CON,FSD,PRO,DEP,WTCON,WTFSD,WTPRO,WTDEP
0100OPTIONS;1,5
0110STATISTICS;ALL
0120READ INPUT DATA
0200 2 1 1 1 1 1 4 4
0210 5 5 2 2 2 3 5 7
0215 3 2.5 3 4 6 4 2 6
0220 1 2.5 4 5 4 5 3 3
0225 6 6 6 6 5 7 5 5
0230 4 4 5 3 3 2 1 1
0235 7 7 7 7 7 6 5 2
9990FINISH
9995$:END JOB

```

RESEARCH HYPOTHESIS II

```

0010 S,R(SL) : ,8,16; ,16
0020$:IDENT:WP1191, AFIT/SIG ESCHMANN AND LEE
0030$:SELECT:SPSS/SPSS
0040RUN NAME;KENDALL TAU STATISTICS
0050VARIABLE LIST;TOTRAW,TOTR,WTTOTR
0060INPUT FORMAT;FREEFIELD
0070INPUT MEDIUM;CARD
0080N OF CASES;5
0090NONPAR CORR;TOTRAW,TOTR,WTTOTR
0100OPTIONS;1,5
0110STATISTICS;ALL
0120READ INPUT DATA
0200 37.02 4 4
0210 46.275 3 3
0215 67.308 1 1
0220 32.871 5 5
0225 49.852 2 2
9990FINISH
9995$:ENDJOB

```

MEANS FOR CONFLICT SOURCE INTENSITIES

AND MODES OF RESOLUTION

```

0010 S,R(SL) :,8,16,1,16
0020$:IDENT:WP1191,AFIT/SIG KARL ESCHMANN AND TERRY LEE
0030$:SELECT:SPSS/SPSS
0040RUN NAME;CONFLICT IN MANAGEMENT
0050FILE NAME;ESCHMANN
0060VARIABLE LIST;Q1 TO Q85
0070VAR IABELS;Q1, PROGRAM NAME/Q2,PROGRAM AGE/Q3,RANK/
0080;Q4,AGE/Q5,EXPERIENCE/Q6,NUMBER OF PROGRAMS/
0090;Q7,EDUCATION/Q8,ORGANIZATION LEVEL/
0100;Q9,PROJECT VS FUNCTIONAL/Q10,SELF AND SUBORDINATES/
0110;Q11,COLOCATED FUNCT PERSONNEL
0120;Q12,OTHER FUNCT PERSONNEL/
0130;Q13,DIVERSITY OF EXPERTISE/Q14,LOW PM POWER/
0140;Q15,LESS SPECIFIC OBJECTIVES/Q16,GREATER ROLE AMBIGUITY/
0150;Q17,GREATER GOAL AGREEMENT/
0160;Q18,LESS PM FORMAL AUTH
0300SUBFILE LIST;FULL (42) PROD (32) DEPL (32) VALI (30)
0400INPUT FORMAT;FIXED (1X,F3,0,F2,0,F1,0,F2,0,37F1,0/1X,44F1,0)
0420INPUT MEDIUM;CARD
0440MISSING VALUES;ALL(0)
0450RECODE;Q3 (1 THRU 5=1)(0=2)(ELSE=3)
0460VALUE LABELS;Q3 (1)MILITARY (2)NO ANS (3)CIVILIAN
0480VALUE LABELS;Q13 TO Q18 (1)STRONGLY DISAGREE (2)DISAGREE
0482;(3)UNDECIDED (4)AGREE (5)STRONGLY AGREE (0)NO ANS
0485RUN SUBFILES;ALL (OR EACH)
0490*SELECT IF;(Q3 EQ 1)
0500FREQUENCIES;GENERAL=Q13 TO Q18
0510OPTIONS;1,8
0520READ INPUT DATA
0532$:SELECTA:77B53/FULLSD,R
0534$:SELECTA:77B53/PRODUCT,R
0536$:SELECTA:77B53/DEPLOY,R
0537$:SELECTA:77B53/VALIDATA,R
0538RUN SUBFILES;ALL (OR EACH)
0540*SELECT IF;(Q3 EQ 3)
0550FREQUENCIES;GENERAL=Q13 TO Q18
0560OPTIONS;1,8
0565RUN SUBFILES;ALL (OR EACH)
0570FREQUENCIES;GENERAL=Q13 TO Q18
0575OPTIONS;1,8
0695RUN SUBFILES;ALL (OR EACH)
0700*COMPUTE;S1=(Q44+Q45+Q46+Q47+Q48+Q49)/6
0710*COMPUTE;S2=(Q50+Q51+Q52+Q53+Q54+Q55)/6
0720*COMPUTE;S3=(Q56+Q57+Q58+Q59+Q60+Q61)/6
0730*COMPUTE;S4=(Q62+Q63+Q64+Q65+Q66+Q67)/6
0740*COMPUTE;S5=(Q68+Q69+Q70+Q71+Q72+Q73)/6
0750*COMPUTE;S6=(Q74+Q75+Q76+Q77+Q78+Q79)/6
0760*COMPUTE;S7=(Q80+Q81+Q82+Q83+Q84+Q85)/6
0770*SELECT IF;(Q43 EQ 1)
0780CONDESCRIPTIVE;S1,S2,S3,S4,S5,S6,S7
0790OPTIONS;1
0800STATISTICS;ALL(OR EACH)

```

0805RUN SUBFILES;ALL(OR EACH)
0810*SELECT IF;(Q43 EQ 1)
0820CONDESCRIPTIVE;Q44 TO Q85
0830OPTIONS;1
0840STATISTICS;ALL (OR EACH)
0845RUN SUBFILES;ALL (OR EACH)
0850*SELECT IF;(Q19 EQ 1)
0860CONDESCRIPTIVE;Q20 TO Q34
0870OPTIONS;1
0875RUN SUBFILES;ALL (OR EACH)
0900*COMPUTE;M1=(Q20+Q21+Q22)/3
0910*COMPUTE;M2=(Q23+Q24+Q25)/3
0920*COMPUTE;M3=(Q26+Q27+Q28)/3
0930*COMPUTE;M4=(Q29+Q30+Q31)/3
0940*COMPUTE;M5=(Q32+Q33+Q34)/3
0950*SELECT IF;(Q19 EQ 1)
0960CONDESCRIPTIVE;M1,M2,M3,M4,M5
0970OPTIONS;1
9990FINISH
9995\$:ENDJOB

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